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# Model Railroader®



May 2009

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**6 TIPS**  
**FOR CHOOSING**  
**A DCC DECODER**  
**P. 72**

The MR staff's Beer Line layout is ready for realistic operation. See page 38

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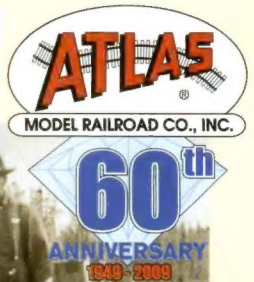
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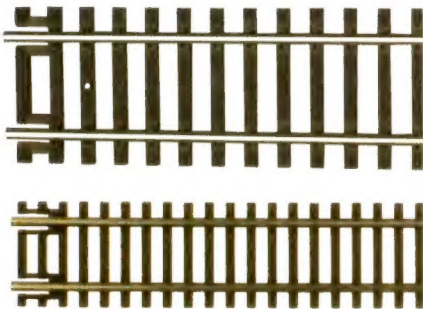
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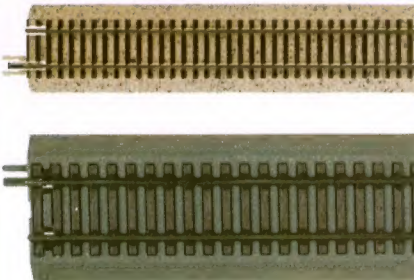
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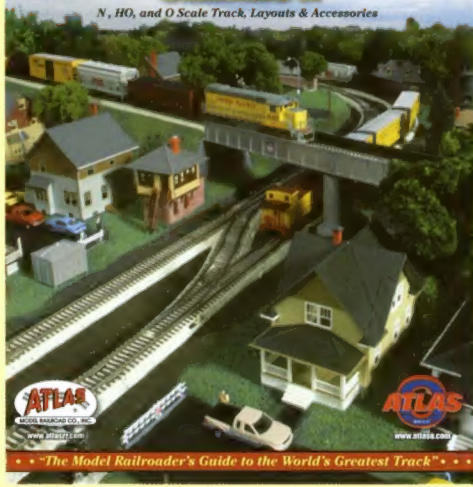
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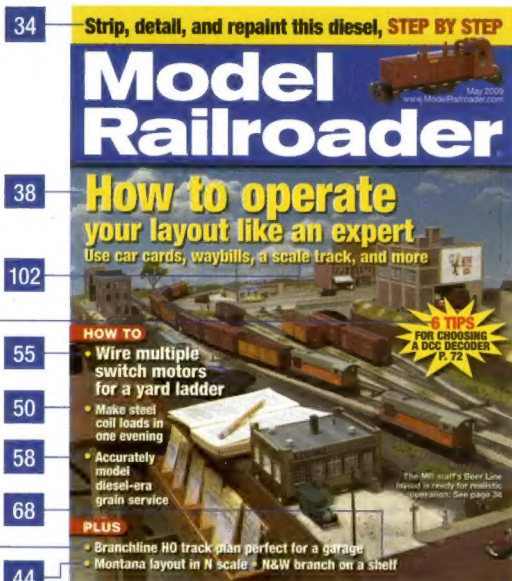
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**Coming next issue:** Two stories that show you how to add lights to your layout's scenery to create drama and interest. Jim Forbes photo



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**RAPIDO**

\*Sorry. That's a complete lie. I got carried away.



## From the Editor

# Wiring and track plans

Neil Besougloff, Editor



We had a bit of a debate (well, maybe more like an engaging discussion) while putting together this month's issue. Specifically, we were discussing Oliver Tansey's story on wiring Tortoise motors to align a sequence of turnouts in a yard.

In his story, Oliver describes a circuit that allows an operator to select a multi-turnout route through a yard with a single twist of a rotary switch.

Other hobbyists have used diodes wired into the circuit to achieve the right chain of electrical events.

Oliver's circuit, however, substitutes resistors for diodes (two per motor), which led to the discussion between associate editor Steve Otte, who was editing the story; executive editor Andy Sperandio; and me.

Andy and I thought the resistor circuit would work fine, but even Andy, who a few years ago wrote a book on model railroad wiring, couldn't quite explain out loud the science behind the circuit.

Steve was skeptical, so, as any good chef would do when confronted with a new recipe, he tried it. Steve's yard tracks and their accompanying Tortoise motors, resistors, and rotary switch, along with Oliver's circuit diagrams, are shown starting on page 55. Steve liked the circuit so much that he's installed one on his growing layout.

There was less electricity in the air when putting together the story on operating our Beer Line project railroad. Everyone on the staff is pleased with the layout. Its operating scheme (see page 38) works without a hitch. The story is the final installment of the Beer Line series. If you are a subscriber, go to ModelRailroader.com to watch a video that explains the operating scheme and other videos showing how the layout was built.

The staff's work on the Beer Line layout is finished, and next year's staff project layout is already under way; that series of stories will begin in January's issue. I can't say much about the layout yet, but I will tell you that there's a lot of yellow paint and vertical scenery, and it makes clever use of double track.

Speaking of track, there was no staff debate over the merits of Michael Flannigan's track-plan story on page 52. Michael is the third-prize winner in our track plan contest. He rendered his plan so artistically that we chose to use his illustration instead of re-drawing the plan in our usual *Model Railroader* graphic style.

Our second- and first-prize track-plan winners are coming up soon, so enjoy this month's issue and stay tuned.

NEIL BESOUGLOFF

## Contributing to *Model Railroader*

We welcome contributions from our readers, including articles, photographs, and prototype drawings. For detailed information on submitting material to MR, contact our editorial associate Eric Stelpflug at 262-796-8776, ext. 583, or [mrmag@mrmag.com](mailto:mrmag@mrmag.com). *Model Railroader* assumes no responsibility for the safe return of unsolicited material. We assume unsolicited material is intended for publication by Kalmbach Publishing Co. unless otherwise noted. We assume letters, questions, news releases, and club news items are contributed gratis.

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# News & Products



**HO scale Canadian National slab-side covered hoppers.** True Line Trains is releasing a line of 3,000-cubic-foot-capacity covered hoppers with round or rectangular hatches. The cars are painted warm gray, either with small red lettering or the large

“wet noodle” herald. They come with blackened metal wheelsets, etched-metal and wire details, and McHenry die-cast metal magnetic knuckle couplers. The Gold Series models are available in six road numbers per scheme for \$45 each.

## Rapido Trains enters freight car market

**R**apido Trains is planning its first freight car, the manufacturer of detailed HO scale passenger cars announced recently.

The Ontario-based company is sticking to its tradition of modeling Canadian prototypes with the first car in its Transcona Yard line. The HO scale wide-cupola caboose is based on a prototype built in the Canadian Pacific's Angus shops.

The caboose model will feature a detailed interior; separate underbody details; etched-metal end platforms and steps; factory-applied grab irons and interior handrails;

working marker lights; and die-cast metal magnetic knuckle couplers.

The first run will be offered in 12 road names, among which will be the Canadian Pacific, Chessie System, CSX, Great Northern, Milwaukee Road, and Rock Island, in as many as 12 road numbers each. The cars will be shipped this fall for a price of \$59.95 each.

Rapido Trains released this photo of a preproduction sample of its HO scale wide-cupola caboose, the first offering in its Transcona Yard freight car line.



### Highlighted in this issue

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## Atlas celebrates its 60th year

Atlas is marking its 60th anniversary in the model railroad business in 2009. Though the firm was started 85 years ago, company officials celebrate 1949 as the year it reincorporated as Atlas Model Railroad Co.

Atlas Tool & Die Co. was founded in 1924 by Stephen J. Schaffan Sr., who was soon joined in the company by his son Stephen Jr. The company got into the burgeoning model train business shortly after World War II, when a hobby shop owner challenged Stephen Jr. to build better track. Atlas built its first model-train factory in 1947, and dedicated itself to the model railroad business with the name change two years later.

Today, Atlas Model Railroad Co. and sister company Atlas O sells N, HO, and O scale products from its headquarters in Hillside, N.J. The company is run by President Diane Schaffan Haedrich, daughter of Stephen Schaffan Jr., and her husband, CEO Thomas Haedrich.



Steven Otte

## InterMountain to distribute Eastern Seaboard products

Manufacturer InterMountain Railway Co. will distribute N scale freight cars made by Eastern Seaboard Models, InterMountain has announced.

The first product is a Pennsylvania RR class G26 mill gondola. The model features detailed interior walls and floor, working drop ends, prototype-specific trucks with low-profile wheelsets, and Micro-Trains magnetic knuckle couplers. Initial paint schemes will be Pennsylvania RR (with circle or shadow key-stone), Penn Central, and Conrail. The cars will be available this summer for \$26.95 each.

### Calendar

**June 18-20: 2009 O Scale National Convention.** Student Union Building, Towson University, Baltimore, Md.

[www.oscaleeast.com](http://www.oscaleeast.com)

**June 27: Ardenrail 2009 (National Model Railroad Association British Region convention).** Arden School, Station Road, Knowle, Solihull, West Midlands B93 0PT, United Kingdom. [www.ardenrail.co.uk](http://www.ardenrail.co.uk)

**July 5-11: 2009 NMRA National Convention and National Train Show.** Connecticut Convention Center, Hartford, Conn. [www.hn2009.org](http://www.hn2009.org)

**July 5-11: 25th National Garden Railway Convention.** Denver Marriott Tech Center, Denver. [www.2009ngrc.com](http://www.2009ngrc.com)

**August 4-8: 2009 National Association of S Gaugers National Convention.** Marriott St. Louis Airport, St. Louis, Mo. [www.nasg.org](http://www.nasg.org)

**Sept. 16-19, 2009: 29th National Narrow Gauge Convention.** Doubletree Hotel, Colorado Springs, Colo. [www.29nng.com](http://www.29nng.com)

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## Operating the Beer Line



See how we set up our HO project layout for operations, including using a car-card-and-waybill system. You can also download a map showing the location of the real Beer Line in the city of Milwaukee.

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**HO scale wood-side Pullman Palace passenger cars.** Cars for four steam-era passenger trains are new from Roundhouse. Shown are the observation, diner, sleeper, and coach from the Pennsylvania RR *Broadway Limited*. The ready-to-run cars are also available for the Great Northern's *Oriental Limited*, Union Pacific's *Overland*, and the

Southern Ry.'s *Crescent Limited*. The cars have metal wheelsets, wire grab irons and truss rods, and magnetic knuckle couplers. They sell for \$24.98.

## HO locomotives

**Electro-Motive Division SD70MAC diesel locomotive.** BNSF Ry. (2005 scheme with "swoosh" logo and Heritage II scheme), Conrail ("Quality" scheme), and Kansas City Southern. Three road numbers each. Five-pole skew-wound motor with flywheels, eight-pin Digital Command Control socket, and McHenry scale magnetic knuckle couplers. \$149.98. August 2009. Genesis series. Athearn Trains

**Electro-Motive Division GP38-2 diesel locomotive.** New paint schemes: Alaska RR, CP Rail, Soo Line (red), and South Shore Freight. Two road numbers each. Eight-pin Digital Command Control decoder socket, five-pole skew-wound motor with dual flywheels, and Accumate magnetic knuckle couplers. \$99.95 (undecorated, \$89.95). June 2009. Trainman line. Ready-to-run. Atlas Model Railroad Co.



**Norfolk & Western class J 4-8-4 steam locomotive.** Six road numbers available. MTH Digital Command System (Digital Command Control-compatible) with ProtoSound 3.0, prototype-specific details, and magnetic knuckle couplers. \$449.95. Ready-to-run. MTH Electric Trains

**General Electric U18B diesel-electric locomotive.** CSX, National Railways of Mexico, Maine Central (Guilford Rail System paint scheme), and Seaboard System. Four road numbers available. Etched-metal and wire details, road-specific cab and body, and Kadee magnetic knuckle couplers. Direct-current model, \$139.95; with Digital Command Control and sound, \$219.95. InterMountain Railway Co.

## HO freight cars

**40-foot wood-chip hopper.** Atlantic Coast Line, Chesapeake & Ohio, Louisville & Nashville, Norfolk Southern, Seaboard Coast Line, and Southern Ry. Two differently numbered four-packs plus single car per road name (nine numbers each). New tooling for wood-chip extension, removable resin wood chip load, and McHenry scale magnetic knuckle couplers. Four-packs, \$69.98; single car, \$17.98. August 2009. Ready-to-Roll. Athearn Trains

**Northeastern-style caboose.** Boston & Maine ("Minuteman" herald), Chicago Great Western ("Lucky Strike" herald), Chicago & North Western (green and yellow paint scheme, three road numbers available), Lamoille Valley (one number), and Penn Central. Four numbers unless noted. Etched-metal and wire details, metal wheelsets, and Kadee magnetic knuckle couplers. \$49.95. Ready-to-run. InterMountain Railway Co.



**Atchison, Topeka & Santa Fe 40-foot PS-1 boxcar.** Class Bx57 car in as-built *El Capitan* scheme. Six-foot Youngstown doors and Kadee scale magnetic knuckle couplers. \$31.95. Ready-to-run. Kadee Quality Products Co.



**Single-sheathed automobile boxcar kit.** Chesapeake & Ohio and Pere Marquette. One-piece cast-resin bodies with Hutchins ends and roof, etched-metal details, and decals; trucks and couplers not included. \$43. Speedwitch Media



**Texas & Pacific boxcar kits.** One-piece vacuum-cast urethane bodies, proprietary decals, and all detailing parts except trucks and



couplers. Double-sheathed 50000 series: with Hutchins or Viking roof, \$38. Series 80000 and 81000 steel rebuilds: wood running boards, \$38, or Morton steel running boards, \$40. Shipping is \$4 for up to five kits. Sunshine Models



**Summers Steel Car Co. ore car kit two-packs.** Duluth, Missabe & Northern; Duluth, South Shore & Atlantic; Duluth & Iron Range/Duluth, Missabe & Iron Range; and Soo Line. One-piece resin body. Trucks and couplers not included. \$55. Westerfield

**Nickel Plate Road caboose kit.** One-piece resin body with separate cupola, etched-metal details, and complete brake gear. Decals and couplers not included. \$56.95. WrightTrak Railroad Models

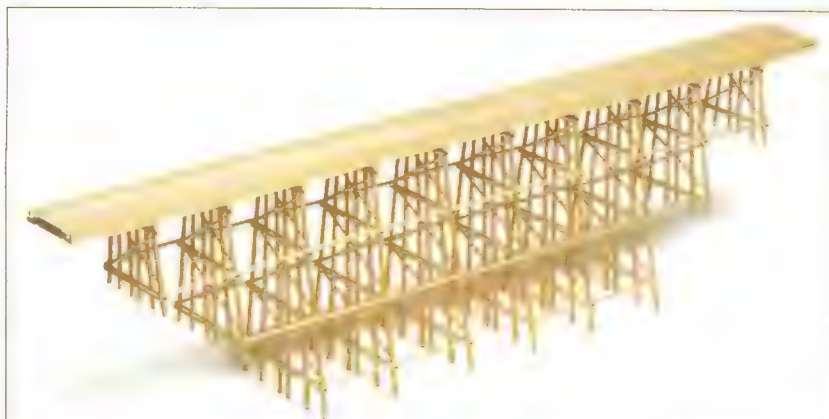
## HO passenger cars



**Osgood-Bradley lightweight 10-window coach.** Bangor & Aroostook (Pullman Green), Boston & Maine (Pullman Green or red/maroon), New Haven (McGinnis scheme, Hunter Green, Pullman Green, or Forest Green). Up to 10 car numbers each; also available undecorated. Detailed interiors, factory-installed wire grab irons, and Macdonald-Cartier magnetic knuckle couplers. \$74.95. Late 2009. Ready-to-run. Rapido Trains



**Pullman-built heavyweight paired-window coach.** Atlantic Coast Line, Baltimore & Ohio, Louisville & Nashville, Soo Line, and Wabash. Road name-specific windows and roofs, detailed interiors, and Proto Max magnetic knuckle couplers. \$49.98. Interior



**Wooden trestle kit with jig.** Black Bear Construction Co.'s trestle kits come with both a plastic jig and scale lumber that has to be cut by the modeler. Its latest offering is an HO scale six-leg trestle, shown in an Atchison, Topeka & Santa Fe ballasted-deck version. Kits range from \$50.72 to \$55.67; jigs and material packs are also sold separately.

lighting kit, sold separately: Direct-current version, \$11.98; for Digital Command Control, \$7.98. Wm. K. Walther's Inc.

## HO details and accessories



**Lower-quadrant semaphore kits.** Styrene construction with etched-metal ladders; can be built as single- or dual-arm style. Two-pack, \$17.95; six-pack, \$49.95. American Limited Models

**53-foot Jindo intermodal containers.** Canadian Tire, CSX ("How Tomorrow Moves" slogan), National Fast Freight, and Totem Ocean Trailer Express. Individual numbers and separate closure rods. Three-pack, \$33.98. Ready-to-Roll. Athearn Trains

**Vehicle license plates.** British Columbia (1950 to present), Illinois (1954), Indiana (1954), Montana (1960 to present), Pennsylvania (1958), Wisconsin (1950 to present), Wyoming (1950 to present), and Yukon Territory (1960 to present).

Printed on photo paper. Set equips at least 20 vehicles. \$1.50 per set includes shipping. Howard's Hobby

## N locomotives

**Electro-Motive Division SD50, SD60, and SD60M diesel locomotives.** New paint schemes: SD50: National Railway Equipment Co. (limited edition) and Union Pacific (Southern Pacific patch scheme, two road numbers available); SD60: CSX (two numbers); SD60M: BNSF Ry. (2005 scheme or BN patch scheme, two numbers). Also available undecorated. Directional lighting, blackened metal wheelsets, and Accurate magnetic knuckle couplers. Direct-current models, \$124.95; with Digital Command Control and sound, \$159.95. Limited edition: DC, \$129.95; DCC and sound, \$164.95. Ready-to-run. Atlas Model Railroad Co.

## N freight cars

**Three-bay offset hopper five-packs.** Atchison, Topeka & Santa Fe; Chessie System (Baltimore & Ohio or Chesapeake & Ohio reporting marks); New York Central; Norfolk & Western; and Union Pacific. Two differently numbered five-packs each. Screw-mounted trucks, removable coal load, and McHenry scale magnetic knuckle couplers. Five-pack, \$69.98. Ready-to-run. Athearn Trains

**Assorted freight cars.** Lehigh Valley 40-foot boxcar with running boards: Six car numbers available  
*Continued on page 14*



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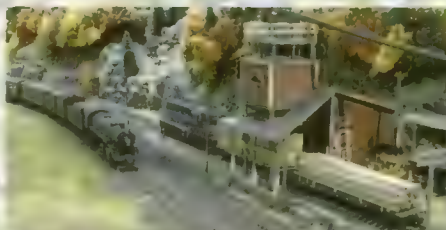
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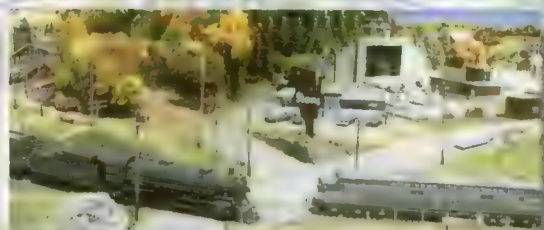


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## News & Products

### Club cars



**HO scale Northern Pacific mechanical refrigerator car.** Custom-decorated Red Caboose car offered by the Northern Pacific Ry. Historical Association. Two body styles available, series R-70-14 and R-70-15. Available in six car numbers per body style. \$42. Ready-to-run. Order online at [nprha.org](http://nprha.org) or mail check or money order to: NPRHA Company Store, 2599 E. Madison, Seattle, WA 98112.



**HO scale 40-foot single-door steel boxcar.** Accurail kit custom-decorated for Tri-State Model Railroaders club layout. Metal wheelsets, extra car number decals, and Accurate magnetic knuckle couplers. \$20 each plus \$5 shipping for one or two cars. Send check or money order to: Tri-State Model Railroaders Inc., P.O. Box 792, Ducktown, TN 37326. For information, e-mail [lencaroljames@bellsouth.net](mailto:lencaroljames@bellsouth.net).



**N scale two-bay coal hopper.** Atlas car custom-decorated for Belmont Shore Lines. Two numbers available. Removable coal load, magnetic knuckle couplers, and optional cross bracing. \$20 each or two for \$35. Add \$5 shipping. Send check or money order to: Bill Costley, 319 N. Malgren Ave., San Pedro, CA 90732. For information, e-mail [bbcstley@earthlink.net](mailto:bbcstley@earthlink.net), go to [www.belmontshorerr.com/cars/](http://www.belmontshorerr.com/cars/) or call 310-831-1140.

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## News&Products

Continued from page 11

in single, double, or three-packs; prices to be announced. Ann Arbor two-bay hopper (split-A herald): Six numbers in single, double, or three-packs; prices TBA. Western Pacific deep-exterior-post wood-chip gondola: Four numbers available in single or three-packs; prices TBA. Trailer Train/Burlington Northern twin-pack Maxi-Stack III five-unit double-stack well car (TTX report-

ing marks): Two sets available, \$99.95 each. Third quarter 2009. Ready-to-run. DeLuxe Innovations **Assorted freight cars.** Milwaukee Road 40-foot drop-bottom gondola, removable "wood" side extensions and pulpwood load; two car numbers available; \$20.55. Fox River Butter Co. 40-foot double-sheathed wood refrigerator car, \$18.65. Delaware & Hudson heavyweight depressed-center

flatcar with load, \$21.55. Great Northern 40-foot double-door boxcar, \$25.45. Norfolk Southern two-bay Center Flow covered hopper, \$22.35. Magnetic knuckle couplers. Ready-to-run. Micro-Trains Line Co.

### N details and accessories

**Body-mount short-shank magnetic knuckle couplers.** With molded brown plastic draft gear boxes. Two pairs, unassembled, \$6.25. Micro-Trains Line Co.

### O freight cars

**American Car & Foundry 17,360-gallon-capacity tank car.** New paint schemes: GATX, GAF Corp., and PPG Industries. New road numbers: Diamond Shamrock and ACF Industries (SHPX reporting marks). Four car numbers each; also available undecorated. Scale handrails, separately applied details, and metal safety bars, tank fittings, and safety placards. \$72.95. June 2009. Ready-to-run. Atlas O

### O structures



#### Silver Falls Lumber Co. kit.

Laser-cut wood siding, details, shingles, doors, windows and conveyor. Footprint 10" x 34". \$398.95. Sidetrack Laser

Continued on page 18

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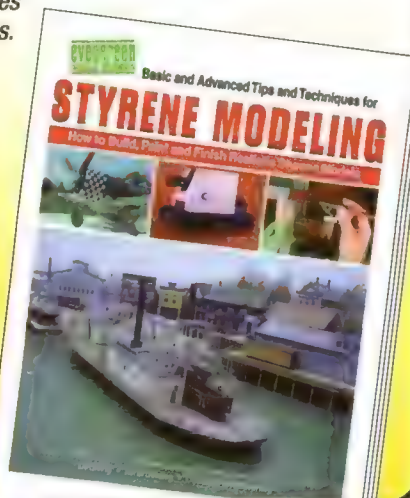
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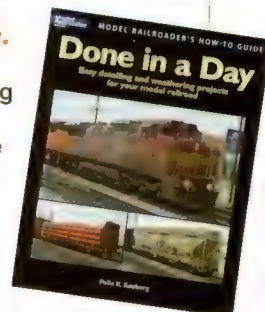
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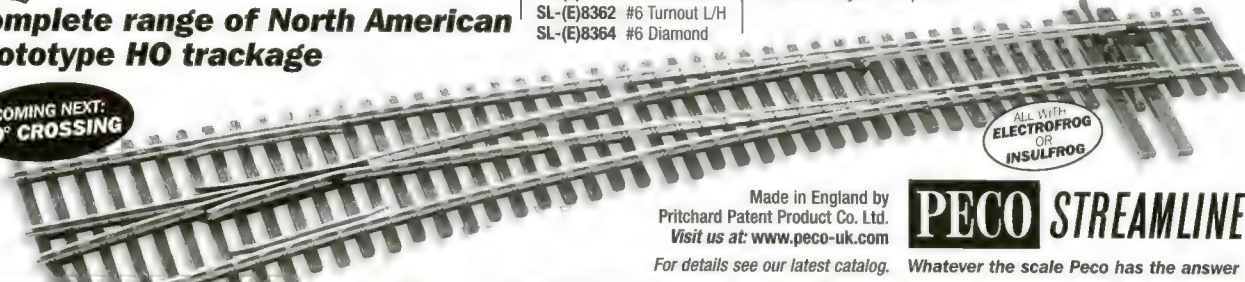
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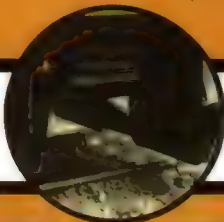
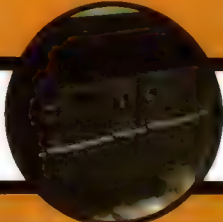
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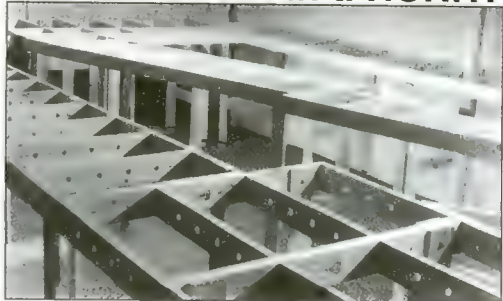
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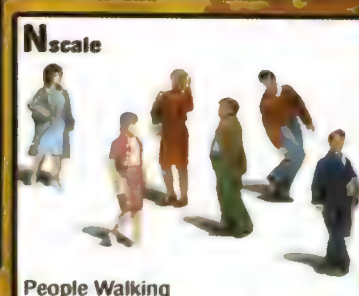
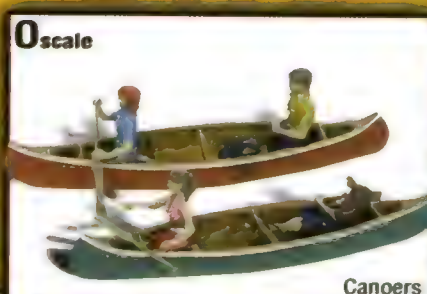
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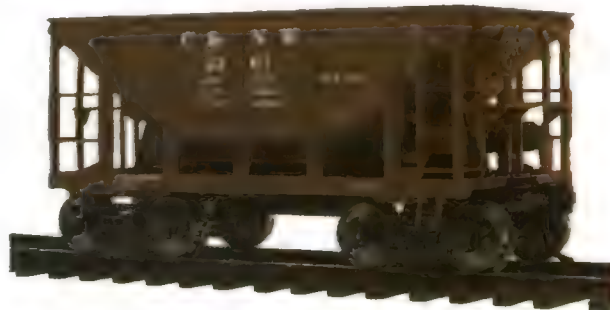
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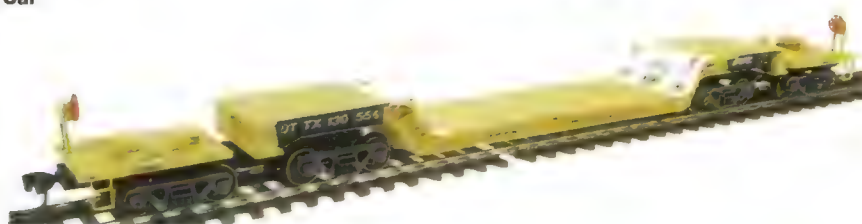
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Continued from page 14

## O details and accessories

**Brass signal accessories.** Relay cabinet, \$14.99. SA-type signal head with light-emitting diodes, \$9.99. D-type signal head with LEDs, \$17.99. N.J. International Inc.

## S details and accessories



**Caterpillar 988H wheel loader.** Die-cast metal and plastic construction. Interior cab detail, positionable parts, and rolling tires. \$77.95. Norscot Scale Models

## Z locomotives

**Electro-Motive Division GP9 diesel locomotive.** New paint schemes: Central Vermont and Grand Trunk Western. Magnetic knuckle couplers. \$185.95. Ready-to-run. Micro-Trains Line Co.

## Z freight cars

**Northern Pacific 40-foot flatcar.** Two car numbers available. Two different timber loads and magnetic knuckle couplers. \$18.40. Ready-to-run. Micro-Trains Line Co.

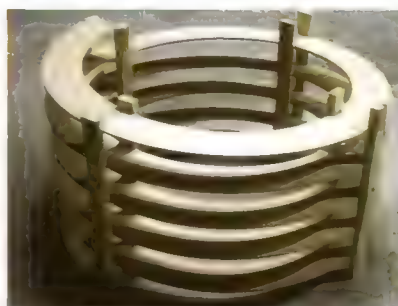
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## Electronics and controls

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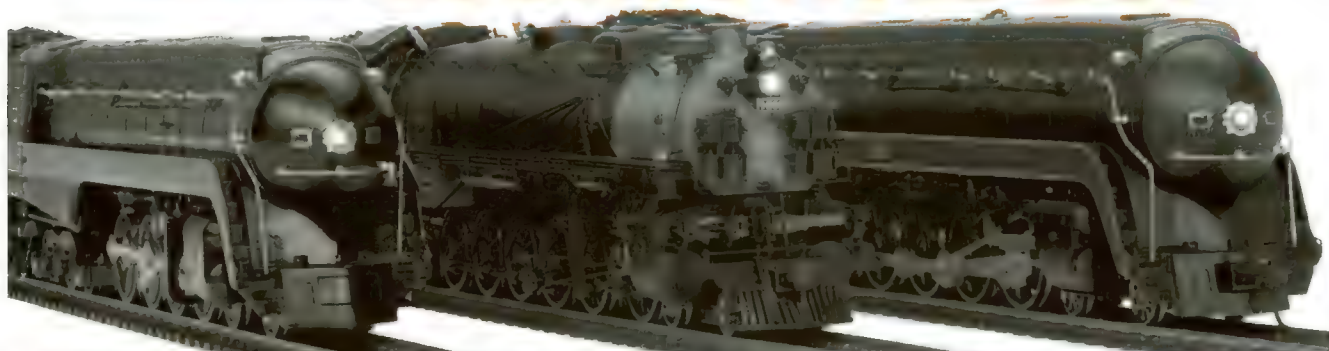
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To see more photos of George Dutka's White River Division layout, check out the March issue of *Model Railroader*. Photo by Lou Sassi

## Stunning photos

Each issue of *Model Railroader* seems to be better than the month before.

I especially want to compliment Lou Sassi on his excellent photography of the White River Division in the article, "Simply

New England," published in the March issue. George Dutka's beautiful model-making and design with Sassi's angles and lighting produced a superior effect that created great color!

Bob Milka  
San Fernando, Calif.

## Small space for a layout

Recent circumstances have dictated that I now have only a small amount of space available for hobbies. With that in mind, I recently collected some N scale items in hopes of starting a layout.

When I saw the articles on the Beer Line (starting in January 2009 *Model Railroader*), I figured that the HO plan, when converted to N scale, would make a nice, compact model railroad. Reducing the Beer Line to N scale seems like it will be without any great compromises, and I'll even have room to broaden the curves a bit.

Roger B. Pound  
Lytham St. Annes, United Kingdom

## Military model railroaders

As a former Canadian military member who has seen overseas service in Bosnia and Afghanistan, I was delighted to see the article on model railroaders in uniform in the March 2009 *Model Railroader*.

I can comfortably say that this recognition goes a long way in letting our military model railroaders know that we are thinking of them and we

thank them for all their sacrifices that they're making.

Wayne Woodland  
Halifax, Nova Scotia, Canada

## Motivated by military

I want thank U.S. Air Force Major Bernard Strouth for shaming me into action! I've been sitting around planning my next model railroad since I retired five years ago, while he's modeling structures on active service in Afghanistan.

Well, you got me out of my armchair! The plans are complete (thanks to an adaptation of the Beer Line track plan), the first batch of lumber is purchased, and I've started construction.

Alan Blair  
Castalian Springs, Tenn.

## Trains of Thought

I enjoyed Tony Koester's column "Trains of Thought: layout visitation etiquette," in the March *Model Railroader*. I posted it on the door to my basement layout at eye level, so everyone can see it as they come in!

Tom Bale  
Springfield, Ill.



You can use real powdered cement to weather cars. Photo by Mont Switzer

## Weathering with cement

I model the Delaware, Lackawanna & Western RR in western New Jersey, and I model covered hoppers that are used in cement service from the cement belt region of eastern Pennsylvania.

I weather my cement hoppers using a similar method to Mont Switzer's, which was described in the March issue of *Model Railroader*. There is one difference, though. I used a different source for the cement, and it works well.

During layout construction, I'd drilled several holes in concrete surfaces, such as the concrete floor and mortar joints in block walls. I decided to collect the powder that was created from drilling the holes and try to use it to weather the cement hoppers.

I figured that the concrete powder had already been mixed with water and cured, and as such wouldn't react with moisture in the air and hurt any of the models I used it on.

I keep the concrete powder in a 35mm film canister, which I got from a department store. It holds enough powder to weather an entire fleet of cars.

Thanks to Mr. Switzer for describing a method that truly achieves the appearance of a weathered cement hopper.

Tom Schmieder  
Long Valley, N.J.

Comments, suggestions, and additional information on MR articles and departments are welcome in this column. Every comment will be read, but not all can be printed or answered. Make your statement in 300 words or less, and send it to Railway Post Office, *Model Railroader* magazine, P.O. Box 1612, Waukesha, WI 53187, or e-mail [rpo@mrmag.com](mailto:rpo@mrmag.com). Please include your name, city, and state.



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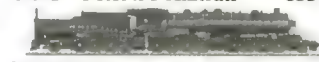
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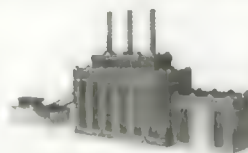
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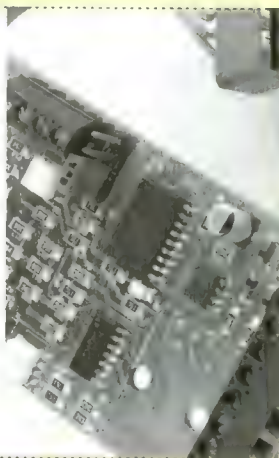
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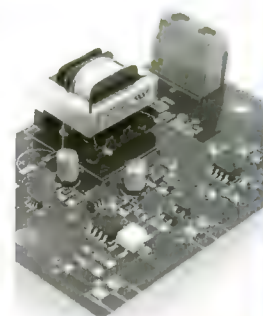
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Union Pacific GP38-2 no. 604 is fitted out with snowfighting gear to protect the engine crew when it works with a rotary plow. Steve Moore photo

## Winter warrior: a GP38-2 outfitted for snow fighting

Can you tell me what the round things are on the front windows of Union Pacific GP38-2 no. 604? Are they some kind of heater? I've seen the same thing on naval vessels and some commercial fishing boats in the winter.

Steve Moore, Salt Lake City, Utah

**The round fittings** on the windshields are rotating windows. They have a motor-driven outer pane of glass that spins to throw off water and snow to provide a clear view of the track ahead. They're commonly found on ships, but these devices are only used on a few locomotives and rotary plows.

Union Pacific engine no. 604 is a GP38-2 that has been specially fitted for snow-fighting service. Judging from the special cab windows and the heavy safety screen across the middle windshields, this unit probably works with a rotary plow. A steel framework on the cab roof knocks down icicles that may be hanging in tunnels and snowsheds. — Jim Hediger, senior editor

I read with interest Andy Sperandio's January 2009 article in *The Operators* on how the Santa Fe provided mixed-train service. However, I'd like a bit more information on how typical mixed trains functioned. Were they a combination of freight and passenger cars? If so, how did the passengers get on? Would the train make multiple stops for passengers, and would the train switch industries along the way? Dan Allen, Vancouver, Wash.

In this context, a mixed train refers to a train consisting of both freight and passenger cars. Until the middle 1950s, mixed trains provided basic passenger service to many remote communities where the cost of running a regular passenger train was prohibitive. Most ran during daylight hours.

Mixed train lengths varied from a few cars to 50 or more during a harvest season. Most of these trains ran in agricultural areas, so the freight cars reflected this business.





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## Information Desk

Mixed trains commonly used a downgraded mainline combine or coach in place of a caboose at the rear of the train. This provided comfortable seating and rest rooms for a few passengers and the train crew. It also served as the conductor's office. If an old combine was available, its baggage area was used to haul small express shipments and company supplies. In cases where older passenger equipment wasn't available, some railroads had special cabooses fitted with extra seats for passengers.

Passengers generally boarded or exited the coach at station platforms. With short trains, the usual procedure was to spot the train so the coach was left at, or near, the depot while the crew worked the local industries from the head end.

Longer mixed trains usually pulled the coach up to the depot, dropped off the passengers, and then backed up far enough to clear the area they needed to do their switching work. Before leaving town, one of the crew would check the depot. If passengers were waiting, the train would pull ahead and stop for them before leaving.

Maintaining a schedule was difficult due to the switching these trains did. Potential riders had to contact the local station agent to find out when the train was expected. A crew could easily spend all day on a 30-mile branch if they had a lot of work to do, or they might be done by noon on a light traffic day. This also meant that any passengers riding on the train had to be patient as well. —  
*Jim Hediger, senior editor*

**I remember an article on weathering Walther's HO hot metal cars that explained how to model the slag around the lip of car. Can you tell me when it appeared?**

*Terry Harrison  
Hendersonville, N.C.*

You're referring to "Weathering steel mill cars," by Lee Vande Visse, which was published in the December 2002 *Model Railroader*.

Back issues are available from Kalmbach's Customer Sales & Service Department by calling 800-533-6644, or by e-mail from customerservice@kalmbach.com.

I use a slightly different method of simulating the cinder "skull" around the spout, one I learned from author and noted modeler Dean Freytag. Apply a bead of thick cyanoacrylate adhesive (CA) around the bottle opening and dip the car upside down in a pile of N scale cinder ballast. Then add another bead of CA on either side and repeat the procedure several times to build up the thickness, leaving the pouring grooves lower on both sides.

After the CA hardens, spray paint the skull with grimy or weathered black and use a paintbrush to add a narrow dribble of silver in and just below the pouring spouts to represent remnants from recent pours. —*J.D.H.*

**Can you elaborate on your planned operations for the Badgerland Ethanol plant on MR's Wisconsin & Southern layout? I'd like to know what the in/out ratio of covered hoppers and tank cars would be and how often the plant needs to be switched per day or week?**

*Greg McComas, Fort Worth, Texas*

I haven't figured out an exact mix for Badgerland, but we can easily determine what will work well for model railroad operating purposes using some figures a friend sent me for a small ethanol plant. The prototype company receives 25-30 loads of corn daily and one car of gasoline every other day to make 8 to 10 loads of ethanol daily.

Since our Badgerland plant is so compact, I'd just cut those quantities roughly in half. Our railroad would then deliver about a dozen loads of corn daily, one load of gasoline every fourth day, and load four or five tank cars outbound per day. Only about half of these cars will fit into the plant's tracks, so this level of traffic would require switching Badgerland Ethanol at least twice daily. I'd deliver half of the cars in the early morning and swap them for the remaining cars in the late afternoon. —*J.D.H.*

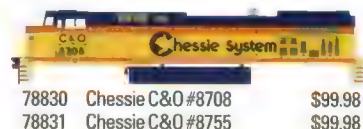
Send your questions about prototype railroading to Information Desk, *Model Railroader* magazine, P.O. Box 1612, Waukesha, WI 53187, or e-mail [proto@mrrmag.com](mailto:proto@mrrmag.com). We regret we can't answer all the questions we receive.



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Photo by Preston George (North American Steam Locomotives:  
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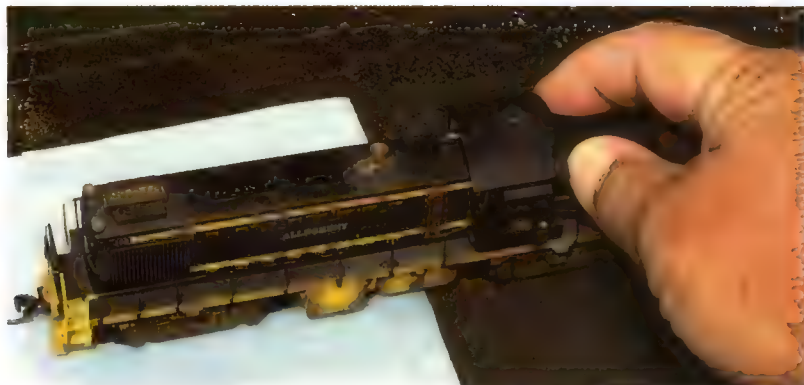
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Lionel Strang cleans his locomotive wheelsets by holding the unit so one truck spins on a piece of shop towel saturated with Wahl Clipper Oil.

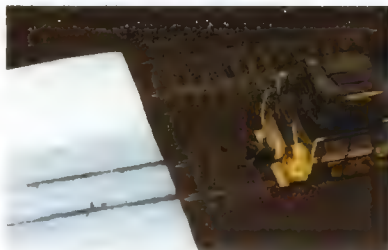
## Easy driver cleaning method improves performance

**The most important thing** you can do to ensure that your railroad runs smoothly is maintain clean track and locomotive wheels. Keeping the track clean isn't difficult. All it takes is a little time, a track cleaning eraser, and some good old-fashioned elbow grease to clean the rails.

If your locomotives have been running for a while, chances are they will need their wheels cleaned. I learned this easy wheel-cleaning method several years ago. To try it you'll need shop towels, available at hardware and auto parts stores, and a few drops of Wahl Clipper Oil.

First, I cut one towel into four individual squares and lay one of the squares over the rails of a powered section of track anywhere on the layout. I then carefully apply a small amount of Wahl Clipper Oil along each rail until the towel is saturated.

Next, I move the locomotive to a spot in front of the paper towel. Holding the locomotive gently in



**The rotating wheels quickly shed an amazing amount of dirt during the short time it takes to clean them.** Lionel Strang photos

place with one hand, I turn the throttle up to get the wheels spinning and let one truck move onto the towel. I hold the truck in place for a few seconds before swapping ends and repeating the process. You'll be amazed at how much dirt is deposited on the paper towel.

Finally, I repeat this procedure with a dry towel to remove any remaining oil and residue.

I try to clean all of my locomotives at least once a year. — *Lionel Strang, contributing editor*

**Temporary spray booth vent.** I needed a reliable way to vent my portable spray booth to the outside. I don't have direct access to an outside wall from my workbench, and our finished basement doesn't provide space for a permanent spray booth. My solution is a temporary window panel that's substantial enough to be left in place for a few days at a time.

I use an Artograph Model 1530 hobby spray booth [Artograph, Inc., 2838 Vicksburg Ln. N., Plymouth, MN 55447, 888-975-9555 — *Ed.*], which I set up on a table near a window, but this venting technique will also work with any spray booth.

I attached a pair of 4" dryer hoses to the two vent ports under the spray booth with ring clamps



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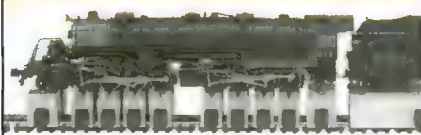


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## Workshop



Chuck Thomas built this portable window insert that incorporates a pair of dryer hoses to direct the spray exhaust out of the house.



The insert's edges are lined with weather stripping and the hoses are sealed with duct tape to make things air-tight. Chuck Thomas photos

and ran short lengths of flexible hose to an outlet panel that fits into the lower sash of the window. When it's time to paint, I just cover the table with a drop cloth, move my spray booth onto the table, place the panel in the window opening, and close the sash.

I cut the window panel from a piece of  $\frac{1}{2}$ " medium-density fiberboard (MDF). It fills the full width of the window and is tall enough for two  $4\frac{1}{4}$ " holes for two louvered vents. I mounted the vents on the outside of the panel

with short sections of rigid metal duct pipe on the inside. I attached the hoses to the pipes with duct tape. (While I had the tape out, I sealed all of the booth's seams to improve the air draw through the filters.) I then primed and painted both sides of the panel, and added flexible weather stripping around the edges for an air-tight fit.

The hoses are flexible enough for the panel to be placed on the spray booth tray for convenient moving and storage. — Chuck Thomas, Wilton, Conn.

**Why would you solder a feeder wire to the inside of the rail? The potential for problems there is so much greater than if the soldering is done on the outside. To avoid melting the plastic ties, I solder feeders to the bottom of the rail joiners before I lay the track.**

William Baldwin, Los Osos, Calif.

I soldered the feeders on our Beer Line project railroad to the inside of the rail to hide them from view. I don't have problems with this as long as I use a thin, straight wire and make sure to tuck it into the web of the rail.

If you want to try soldering feeders to the rail, here are a few tips to avoid melting the ties:

1. You only need a light coat of solder on the rail when you tin it.
2. The iron has to be really clean and then tinned.
3. Getting the wire tight against the rail before applying the iron is important for good heat transfer.

If you do those three things, it should take only seconds to make the soldered joint. And yes, I melted my share of plastic ties while learning this technique, and still melt one from time to time. — Terry Thompson, publisher

**Several recent articles have featured scenery and track weathering with an airbrush. I'm wondering where the overspray goes? How do you protect the equipment and finished items that are already installed on the layout?**

David Palmer, Philadelphia, Pa.

We take a number of precautions. First, we use water-based acrylic paints in a well-ventilated room that has an exhaust system, and the painter wears an Occupational Safety and Health Administration (OSHA) approved spray mask.

Naturally, we remove all rolling stock and anything else that's loose. Our weathering colors are quite thin so it doesn't take much air pressure to spray them, and this helps minimize the overspray.

Pieces of thin cardboard can be propped in front of structures or held in place manually to contain the overspray. The trick here is to tear the cardboard to make a ragged edge so any overspray cannot produce a straight line.

Finally, a little planning saves a lot of potential problems. On our recent project railroads, we always weathered the track before anything else got in the way. — J.D.H.

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Can't find a locomotive painted for your favorite prototype? No problem. Cody Grivno shows you how to strip, detail, and repaint a factory decorated model in this month's Step by Step. Bill Zuback and Jim Forbes photos

## Strip, detail, and repaint a diesel switcher

I was excited when Broadway Limited Imports released a Phase V Electro-Motive Division NW2 in HO scale. However, I knew it would be a long shot that the firm would offer the model lettered for Independent Locomotive Service (ILSX), a Minnesota-based leasing company that supplies engines to the prototype I model. When my search for an undecorated model came up dry, I decided to strip and repaint a factory-decorated model.

When searching for a locomotive to strip and repaint, I look for one with limited graphics. The Peoria & Pekin Union Ry. NW2 fit the bill

nicely. It had a herald and road number on the cab sides, the road name on the sides of the hood, and the road number on each end. This was easy to remove using Chameleon paint stripper, a plastic-safe product found at most well-stocked hobby shops.

Once I'd stripped the paint off the model, I began adding the details. Though I'd photographed ILSX 1019 prior to repainting, I had no images of the unit in its new paint scheme. A quick search of two Web sites, [www.railpictures.net](http://www.railpictures.net) and [www.rrpicturearchives.net](http://www.rrpicturearchives.net), yielded plenty of prototype photos.

These images were useful not only for adding the details (step 3), but for painting (step 5) and decaling (step 7). Yes, as odd as it looks, the 1019 is missing the bottom light on its front and rear headlights.

I wanted the switcher to look relatively new, so I lightly weathered the unit with Polly Scale Rust and Dirt and sprayed the model with a clear satin finish. You can see the finished model in the photo above.

The next time you're unable to find a model decorated for your prototype, don't give up. Instead, strip and repaint a locomotive to match what you're looking for. **MR**

### Step 1 Paint stripper

Since I had to strip the shell and chassis, I completely disassembled the model. I carefully recorded the location of screws, wires, and detail parts so I could properly reassemble the engine once it was finished.

I soaked the model in Chameleon paint stripper ([www.chameleonproducts.com](http://www.chameleonproducts.com)) for 20 minutes, following the manufacturer's instructions. Do this in a well-ventilated area and wear proper eye and hand protection.

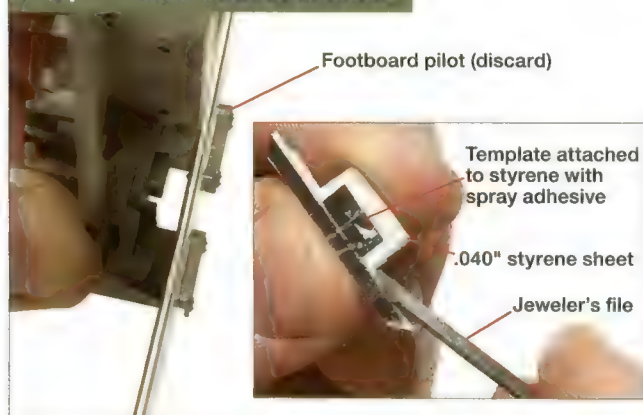
Then I used a soft-bristled toothbrush and a cotton swab to carefully remove the paint and lettering. Though the lettering came off with little effort, the multi-color herald was a bit more stubborn. I soaked the cab for another 15 minutes to soften the paint.

After the shell and chassis were completely stripped, I rinsed them off with water and let them air dry.





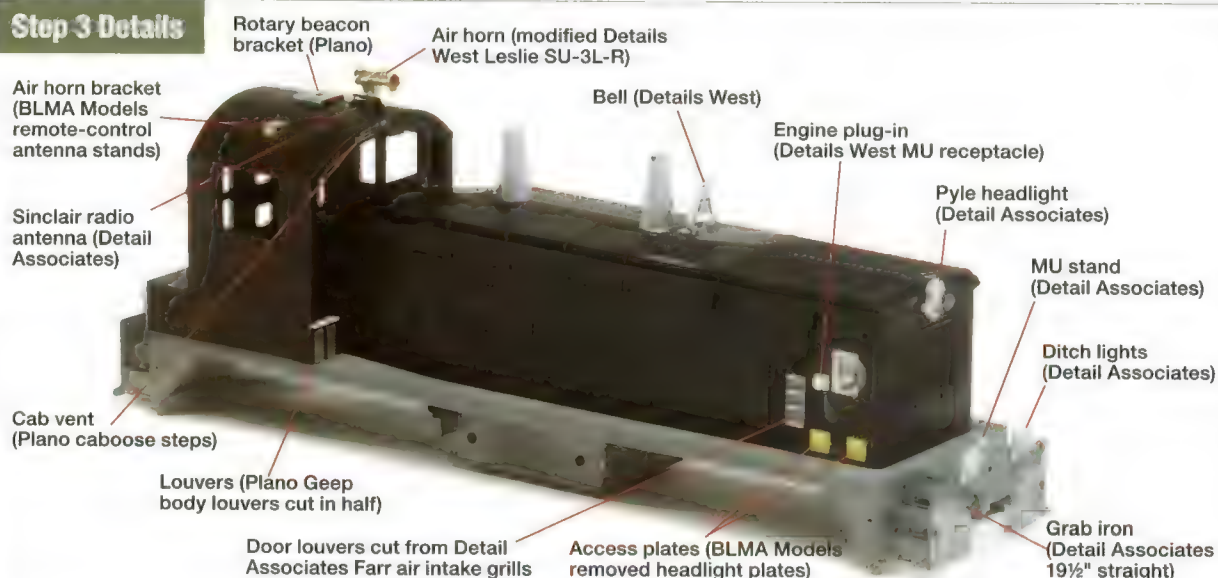
## Step 2 Chassis modifications



The zinc-alloy chassis has cast footboards on the pilots, which I removed with a razor saw to match the prototype, as shown at left. I made the cut from the back of the pilot because there was a slight lip that served as a guide for the saw. I used a file to smooth the cut.

I then replaced the footboard pilots with flush-fitting pilots made from .040" styrene sheet. See inset photo. Fortunately, I found a photo of the end of the 1019 on the Internet. I reduced the photo to HO scale on a photocopier and used that as a template for cutting the styrene. I attached the styrene to the metal chassis with medium-viscosity cyanoacrylate adhesive (CA) and braced it from behind with .080" styrene strip.

## Step 3 Details

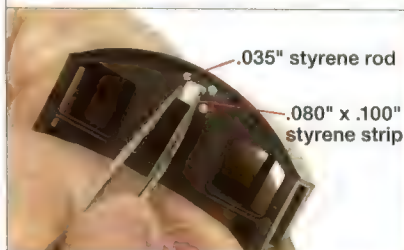


**Detailing was by far** the most time-consuming part of the project. I used detail parts from BLMA Models, Detail Associates, Details West, and Plano Model Products, as noted in the photo. I attached the plastic parts with Tenax-7R and the metal details with CA.

**Though most of the detail parts** were easy to install, a few required some extra effort, including the headlights. See the three photos below. I removed the original headlights and filled the openings with .035" styrene rod and .080" x .100" styrene strip.

Next, I used a toothpick to carefully apply medium-viscosity CA along the seams between the styrene and the shell. I let the CA dry and then sanded it smooth with 400- and 600-grit sandpaper, being careful not to damage the molded nut-bolt-washer detail on the cab.

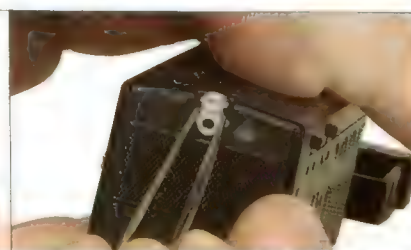
Then I installed the Pyle early dual headlight. Per the prototype, I removed the lower lens using a file. Since the casting doesn't fit properly on the back of the cab, I used a file to make it smaller. The headlight may look undersized at first, but once the model is painted, you'll hardly notice the difference.



First, Cody plugged the headlight holes with styrene.



Then he used a toothpick to apply gap-filling cyanoacrylate adhesive.

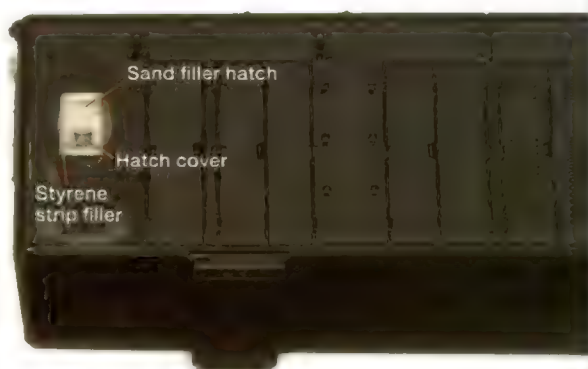


Cody installed the new headlight casting with liquid plastic cement.

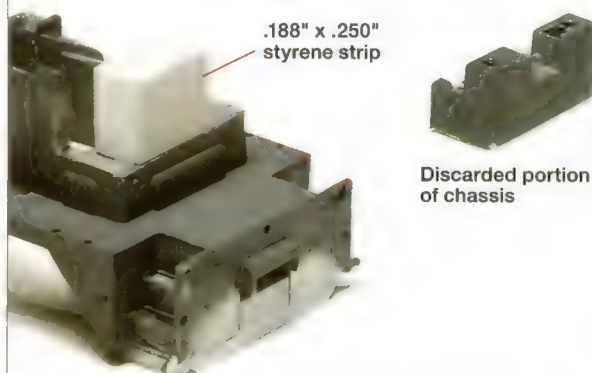


# Step by Step

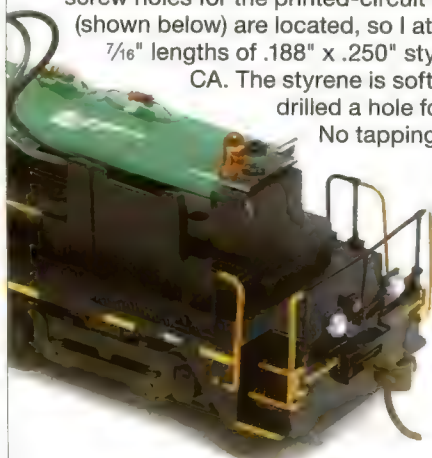
## Step 4 Sand filler hatches



The 1019 has different sand filler hatches than stock NW2s. The closest part I could find was Details West no. 241, designed for newer General Electric diesels. The housings are a bit taller than those on the prototype, but they're reasonable stand-ins. I used hatch covers from Detail Associates because they more closely matched the style used on the full-size diesel.



I encountered a slight problem when installing the sand filler hatches. The castings are thicker than the shell, so I had to remove a piece of the front of the chassis with a razor saw to let the shell seat properly. However, this portion of the chassis is where the screw holes for the printed-circuit (PC) board (shown below) are located, so I attached two  $\frac{7}{16}$ " lengths of .188" x .250" styrene strip with CA. The styrene is soft, so I just drilled a hole for the screw. No tapping was required.



## Step 5 Priming and painting



With all the details in place, I soaked the shell and chassis in warm water with a few drops of liquid dish detergent. This helps remove any dust and skin oil that might affect paint adhesion. I let the parts air dry on a lint-free towel.

I then sprayed the shell and chassis with Polly Scale Undercoat Light Gray. Since I used brass, white metal, and gray plastic detail parts, spraying the entire shell gray helps ensure the final color will be even over the entire model.



After letting the model dry overnight, I sprayed the shell with Polly Scale New York Central Pacemaker Red and the chassis Steam Power Black. I used a paintbrush to apply Zinc Chromate Primer in the rear headlight opening to match the prototype.



The handrails are plastic, so I brush-painted them with Pactra racing finish. This paint is designed for flexible remote-control car bodies, so it won't chip off the handrails when the model is handled.



## Step 6 Into the Future

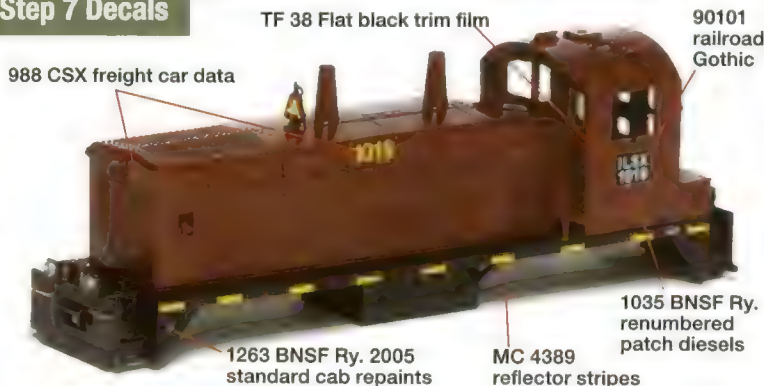


During a conversation with Aaron Skinner of our sister publication *FineScale Modeler*, he suggested I try using Future floor polish as a clear coat. The product can be applied with an airbrush without thinning, and ounce-for-ounce it's cheaper than gloss coats for models.

I decided to give the Future a shot, experimenting on the switcher's chassis. Per Aaron's advice, I applied two light coats to get the chassis wet. Then I applied two heavier coats, being careful to avoid runs. Though the Future may look thick, it shrinks down. I let the Future dry for 24 hours before handling the chassis. Though the polish may feel dry, it stays tacky for several hours.

I have mixed feelings about Future. Though it provides a good gloss finish, the slow dry time is frustrating, especially with deadlines!

## Step 7 Decals



There's no commercial decal set for ILSX locomotives, so I used decals from six different Microscale sets, as listed in the photo.

I soaked the decals in distilled water, which is free of minerals that can dry white on the model. Before applying each decal, I brushed Micro-Set where the lettering would go. This product helps in positioning the decal and minimizes trapped air bubbles.

I let the decals set overnight. I then applied Micro-Sol, which snugs the decals over uneven surfaces. After the first application evaporated, I checked for any trapped air bubbles. I poked the bubbles with the tip of a no. 11 blade and applied more Micro-Sol until the decals laid flat.



I carefully wiped the model with a damp sponge to remove glue residue from decals and other impurities that could affect the adhesion of the Polly Scale Clear Satin. I used this instead of Clear Flat because the prototype was recently painted and is still fairly shiny. I lightly weathered the model with thinned Polly Scale Rust and Dirt.

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1. *Model Railroader* staff members Dana Kawala, Steven Otte, and Andy Sperandio hold an operating session on the Beer Line. This month Andy and David Popp show you how to set the layout up for operation.

# Operate the Beer Line

## PART FIVE

Preparing our sectional HO railroad for operation and running a typical session

By Andy Sperandio with David Popp • Photos by Bill Zuback

**W**ith the completion of our HO scale Beer Line project railroad (featured in the January through April 2009 issues of *Model Railroader*), managing editor David Popp and I set to work on getting the layout ready to operate. In this, our final installment in the Beer Line series, I'll describe an operating session on the layout. Along the way, David will explain some of the things we did to prepare the layout for operation. Many of the techniques we show here can be used to begin operating almost any model railroad.

### Working the Beer Line

Our Beer Line layout represents the far south end of a north-south branch that served as an extended switching lead for breweries and many other industries north of downtown Milwaukee. It includes the hub for crews working the Beer Line's south end, Humboldt Yard. Transfers known as "Beer Trains" ran twice daily from downtown Milwaukee yards by way of North Milwaukee at the north end of the Beer Line to bring inbound cars to Humboldt.

After setting out their cars at Humboldt Yard, these trains picked up out-

### ► Build the Beer Line series

**January 2009:** Track plan, layout configurations, and benchwork

**February 2009:** Roadbed, track, wiring, and Digital Command Control (DCC)

**March 2009:** Ballast, scenery, streets, and the Milwaukee River

**April 2009:** Building structures of all sizes and adding details

**May 2009:** Preparing the layout for operation and running a session



# OPERATING THE BEER LINE



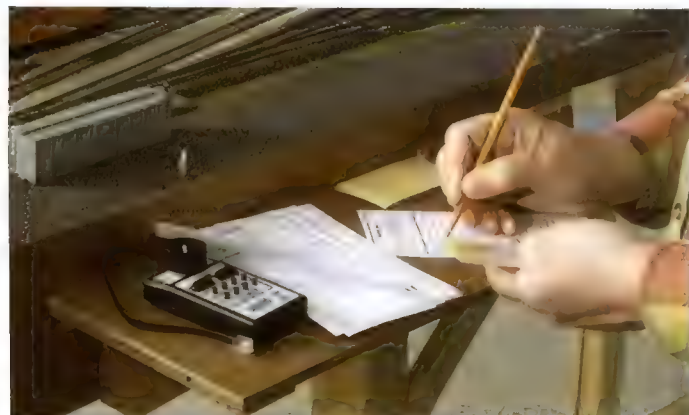
Andy's description of operating the layout features the Beer Line set up in the J configuration, as shown here.

bound cars headed for other points, both on the Milwaukee Road and anywhere else by way of connecting lines. Then these transfers returned the way they'd come. Running at roughly 12-hour intervals, there was an Afternoon Beer Train and a Midnight Beer Train.

## Staging the Beer Line

Lacking staging yards, we use on-layout staging and begin our operating day with inbound cars left by the Midnight Beer Train at Humboldt Yard. When the yard crew comes to work in the morning, they find these cars on the Humboldt lead and on the line across North Avenue.

The cars will have been exchanged for those left as outbound cars at the previous session, and they'll all have waybills for industry spots served out



2. After sorting the Midnight Beer Train, Andy, serving as yard clerk, writes up the switch list for the day's first switching run.

## Milwaukee Road Beer Line J configuration

HO scale (1:87.1)  
Layout size: 10 x 14 feet  
Scale of plan:  $\frac{1}{2}$ " = 1'-0", 12" grid  
Numbered arrows indicate photo locations



Illustration by Rick Johnson

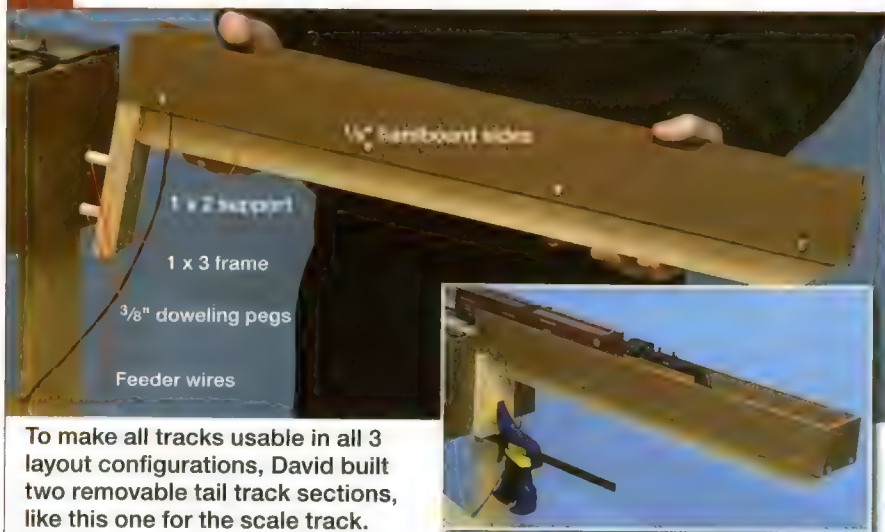


## OPERATING THE BEER LINE



3. Steve (engineer) and Dana (conductor) are working as today's local crew. Steve is preparing to pull a cut of cars from the Schlitz "C" House bottling center.

### Removable tail tracks



To make all tracks usable in all 3 layout configurations, David built two removable tail track sections, like this one for the scale track.

**Because we built** the layout to be used in any of three configurations, in some setups, we have one or two tracks that need to be extended to be useful. I made two removable tail tracks, one for the scale track and one for the runaround track by the Blatz warehouse. These temporary tail tracks plug into the layout when needed, are held in place with a clamp, and have a set of feeder wires that plug into the track bus to power the rails.

The removable tail track frames are made from 1 x 3 pine boards and have a 1 x 2 attached to the bottom for support. The finished tails are cut 24" long. All the joints are glued and parts are fastened with wood screws. I used 3/8" doweling pegs (the same as on the layout sections) to align the tail tracks with the benchwork. To protect the trains on the tail sections, I built 2 1/2" tall walls from 1/8" tempered hardboard. – David Popp

of Humboldt. The "conductor" of the Midnight train – whichever of us stages the layout – leaves a switch list form listing the train's cars in order along with the car cards and waybills.

With on-layout staging we're omitting the Afternoon Beer Train. If you had room to add a staging yard to this layout, two tracks would let you run both the Midnight and Afternoon Beer Trains from staging to Humboldt Yard and back.

### Yard work

The first job for the Humboldt Yard switch engine crew is to sort the arriving cars into cuts for the three switch runs that work out of Humboldt. These are the "C" House Job, which also works the Schlitz cullet track and Schuster's warehouse; the Elevator Job, switching the Schlitz and Pabst elevators, Pabst Shipping Center No. 30, and the Commerce Street Power Plant; and the Freight House Job, which also serves the Blatz warehouse and the team track.

The yard clerk at the Humboldt office marks up the list of the inbound cars showing which of the three jobs will handle each car. The clerk also adds any cars that may have been waiting in the yard for the next convenient switch run. These may be cars that couldn't be spotted earlier for lack of track space, and cars brought in by one switch run going back out on another job.

The yard engine crew, probably the same person as the yard clerk, will sort the arriving cars and those in the yard according to the list. The cards can be left on the desk until the sorting is done, and then placed in the appropriate yard track file boxes.

Then the yard engine and crew go "on spot" (on break) at the yard office so the "C" House Job has room to work on the Humboldt Yard lead. As each switch job returns to Humboldt, the yard crew organizes the incoming cars for the outbound Beer Train.

### "C" House Job

The industrial switcher crew gets on its engine at the yard office and moves over to the yard lead to pick up the cars for the "C" House Job. They won't take a caboose, since all the work is just across the tracks from the office. The clerk has meanwhile filled out a switch list for the "C" House Job. It lists the cars to be delivered, and also any cars to be picked up at the "C" House bottling plant, the cullet track, and Schuster's warehouse.



The "C" House crew works from this list, but may re-sort the cars for convenience. They want the cars for each of the three "C" House tracks grouped so each track can be set in one move. Cars for the cullet track and Schuster's will be held next to the engine, to serve as a "handle" for reaching into the "C" House.

When ready, the switcher pushes the cut toward the "C" House. After checking with the warehouse foreman to be sure the outbound cars are ready to move, the switch crew reaches in with the full cut and pulls all three tracks. They set the outbounds over onto the Beer Line running track (it would be the main track were it not just an industrial lead) past the switch to the cullet track. Then they push the inbound cars to their spots.

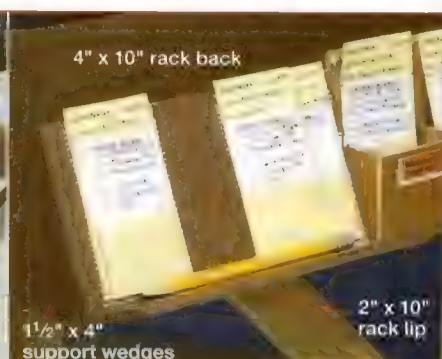
If there's work at the cullet track, that comes next, and then the switcher comes out onto the running track to swap outbound and inbound cars at Schuster's. When that's done, the switcher drags all the pickups back onto the Humboldt Yard lead, while the conductor makes out a new list for this cut.

The engine cuts off and returns to the yard office, then the yard switcher



4. The Elevator Job switches the grain elevators on the Beer Line. Steve is pulling an empty boxcar and a load to be re-spotted from the Pabst elevator.

## Adding office space to the layout



To make the Humboldt yard clerk's job easier, David built a fold-up desk from  $\frac{1}{4}$ " tempered hardboard. The desk uses two hinged supports that fold under the top when not in use. You could also build a simple permanent desk.

David installed several card-sorting shelves around the layout, so the operating crew could sort car cards.

**For our Beer Line** operating sessions to be successful, we needed to provide our crew members with some office space. So, I built a desk and some sorting racks for the layout.

I started by building a fold-up desk for the Humboldt yard clerk. The desk is made from pieces of  $\frac{1}{4}$ " tempered hardboard, and it uses a total of six  $1\frac{1}{2}$ " brass hinges (two for each support wing and two for the top) to fold out of the way when not in use. The desk sticks out from the layout just  $\frac{7}{8}$ " when closed.

The 10" x 16" top is made from a single piece of  $\frac{1}{4}$ " hardboard, and it's framed with two layers of  $1\frac{1}{2}$ "-wide

strips of  $\frac{1}{4}$ " hardboard. This frame creates a pocket for the support wings when everything is folded up. In hindsight, it would have been far simpler to have made a permanent desk or a simple clamp-on desk, using similar construction techniques as those I used on the trail tracks, shown on the previous page.

I also built some sorting racks for the switching crew to use. The racks measure 10" long and are made by gluing and clamping four pieces of tempered hardboard together. The dimensions are given in the photo. Each rack attaches to the layout with two  $1\frac{1}{4}$ " screws. — D.P.



## OPERATING THE BEER LINE



5. The tail track added to the end of the layout lets the crew use the Juneau Avenue lead track as a runaround when the Beer Line is in the J configuration.



6. Dana, as conductor of the Freight House Job, refers to his switch list while making pickups and deliveries. He'll file the car cards when the work is done.

goes to the south end of the lead. If there are any carloads of cullet (broken glass) to be weighed, the yard crew sets them onto the block for the Elevator Job. Then they shove the remaining cars from the "C" House Job out of the way across North Avenue, and wait there while the next job gets to work.

### Elevator Job

The industrial switcher pulls out of the engine track again, this time with a caboose, and backs over to the Humboldt lead. The conductor has a switch list made out by the yard clerk showing where to spot the cars he'll take out of Humboldt Yard, and which cars to pick up or respot at the industries.

Leaving the caboose on the north end of the lead, the switcher runs around on the running track and pulls the Elevator Job cars out of the yard. It may just set them over on the caboose to make up its train, but if the conductor wants to re-block the cars, he does so now. Generally he wants any cullet car(s) to be weighed to be first behind the engine, followed in order by cars for the Schlitz elevator, the Pabst Shipping Center, the power plant, and the Pabst elevator.

When ready, the Elevator Job sets out south from Humboldt Yard, and the Humboldt yard switcher follows it back onto the lead to work the cars from the "C" House Job.

At Schlitz the Elevator Job picks up grain boxcars that have been unloaded and reloaded with spent grain, used in dog food and other animal feeds. Then it sets out the incoming grain cars. The loads of spent grain need to be weighed, as do any cullet loads brought down from Humboldt.

The next stop is the scale track, to weigh the spent grain and cullet cars. See this month's *The Operators* on page 102 for the weighing procedure and more on using scale tracks.

After the weighing, the crew pulls any outbound loads from the Pabst Shipping Center next to the scale track, then spots an empty reefer for the next load.

Crossing Commerce Street, the elevator Job pulls onto the Juneau Avenue lead track to reach the power plant and elevator spur. First, the crew pulls all the empties off the spur. If there's a

### More on our Web site

To watch a Beer Line video, see a map of the prototype line in Milwaukee, and read how Andy does the Freight House Job, visit [www.modelrailroader.com](http://www.modelrailroader.com).



loaded grain boxcar at the far end waiting to be re-spotted at the Pabst elevator, they pull that car too. Then they line up the cars going into the spur in this order: arriving grain boxcar, grain box to be re-spotted, and loaded coal car. They push those three cars to their spots on the spur, then pull the rest of the train onto the lead, leaving the caboose just north of Commerce Street.

From that position the engine can run around the train to get the caboose and place it at the south end for the return trip. Then the engine goes to the north end of the train, the crew "laces up" the air hoses and makes a brake test, and the Elevator Job goes home.

## Freight House Job

The industrial and yard crews go through pretty much the same procedure as before to handle the returning Elevator Job. The main difference is that before pushing the inbound cars beyond North Avenue, the yard crew sets the caboose on a yard track where it can be reached for the Freight House Job. Again, the clerk made a list for this next run while the Elevator Job was out.

Switching the Beer Line with separate jobs like this does more than follow the prototype. It gives us realistic work for two to four operators, keeps the trains short enough for the layout, and makes the railroad seem larger than if we tried to do everything at once.

The conductor of the Freight House Job may also organize his cars before pulling out of the yard. For this run, the preferred order is any car for freight house doors six or eight, cars for Blatz, cars for the team track, and any car for freight house door one. (Limited space means we can set cars only at freight house doors one and six or eight, but that leaves the other doors available for trucks, as they were on the real thing.)

Here's the Freight House Job heading south as listed from front to rear:

NYC 160000, X (boxcar), for freight house door eight.

URTX 5847, R (refrigerator), for the Blatz warehouse.

URTX 87028, R, Blatz.

MILW 703425, X, team track.

MILW 18522, X, freight house door one (spot on switch across from door).

MILW 010803, N (caboose).

The list also shows the following cars to be picked up and where from:

MILW 703848, X, freight house eight.

NH 34006, X, freight house one.

URTX 2037, R, Blatz one (back).

## Using car cards and waybills



To set up the car forwarding system, David and Andy filled out a car card and waybill (at least one step to start) for each freight car on the Beer Line.

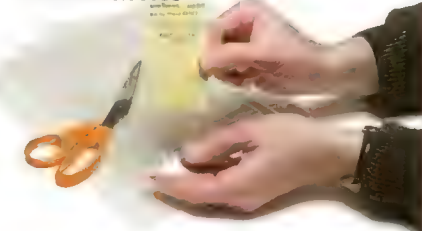
For the Beer Line, we bought a Micro-Mark 82916 car routing starter set and several extra 82914 car card boxes ([www.micromark.com](http://www.micromark.com)). The set comes with complete instructions on how to use it, and we had it ready to go in a few hours.

In this system, each car needs its own car card, and that card follows the car wherever it goes on (or off) the layout. The car card provides some basic information about the freight car, including its type and reporting marks (road name and car number).

The car card also has a pocket that holds a waybill. Waybills provide information about where to send the car and what it's carrying. The Micro-Mark system uses four-cycle waybills, meaning that there are actually four waybills printed on each slip of paper. After a car is delivered to its billed destination, the waybill can be turned to its next cycle, providing new routing information for the car.

A lot has been written about car-forwarding systems (methods for moving freight cars). For detailed information, see Tony Koester's book, *Realistic Model Railroad Operation* (Kalmbach Books). — D.P.

One 10-card plastic sheet makes six usable sleeves



Following reader Bryn Crandell's suggestion, David made protective plastic sleeves for the car cards by cutting up Avery 76009 standard business card pages.



Each industry track on the Beer Line has its own card box slot. David made labels for the card boxes using Microsoft Word. He cemented the labels in place with a glue stick.

URTX 7044, R, Blatz two.

C&IM 8103, X, team.

Referring to the track plan on page 39, how would you do this work? You aren't allowed to move any cars spotted by the other jobs, the plug-in tail tracks hold an engine and three cars each, and the engine can't go inside at Blatz. After you've worked out how you'd switch the Freight House Job, go to the Web reference on the opposite page to read how I'd do it.

When the Freight House Job makes it back to Humboldt, the crew leaves the engine next to the yard office. The Humboldt switcher then finishes assembling the outbound Midnight Beer Train, and when that's done, the yard crew goes off duty. It's the end of another day's work on the Beer Line, but it won't take long to swap a new train of inbound cars into the staging position and start all over again. **MR**



# Montana Rail Link in N scale

1. Train SL, the daily eastbound Montana Rail Link manifest freight on Ernie Poole's N scale layout, glides downhill through Logan, Mont. Logan's numerous local industries keep switch crews busy during operating sessions.





# A prototype-based layout enhanced with freelanced industries

By Ernie Poole

Photos by Lou Sassi



**D**escribing a layout as a “freelanced prototype” may sound like a contradiction in terms, but it explains exactly how my N scale model railroad came to be. My layout is rooted in today’s Montana Rail Link (MRL), but started life without a prototype identity.

After many years of building and displaying my Ntrak modules at various events in the Massachusetts area, I began thinking seriously about building a home layout. I’d built small layouts in both HO and N scales before and participated in layout visits and operating sessions on quite a few model railroads, which helped clarify my goals. I chose N scale because of the way the trains fit the scenery, and I had a good idea of what I wanted to accomplish and what worked for me.

I’d seen some beautiful railroads in dark, unfinished basements; operated on a few great-looking railroads that ran poorly; and visited some smooth running layouts that were “plywood Pacifics” with little potential for ever getting scenery. It seemed that each railroad I visited had some solid ideas that really worked. However, my favorites remain the well-finished layouts where I walked through the door and was struck by their initial impression: “WOW, what do we have here?” With all these experiences in mind, I felt that I was finally ready to begin building my own railroad.

**2.** A pair of former Santa Fe GE Dash 9-44CWs, led by BNSF no. 727, bring a mixed freight into the yard for a crew change at Missoula. This is a high-priority through train, so its new engineer will soon be notching up the throttle to continue its eastbound battle with the mountains of Montana.

## Track plan at 30,000 feet

My youngest son’s departure for college in 1989 allowed me to claim the walk-in lower level of our 13 x 26-foot home addition for my long-awaited railroad. I spent several months finishing the room with a drop ceiling, fluorescent lights, and sky blue walls. I also installed an off-white tile floor and finished up with an off-white base molding along the bottom of the walls. When my son walked in and said “Hey Dad, you built a surgical suite,” I knew the room was ready. The original daylight fluorescent tubes have since been replaced with 5000K natural sunlight units for better color rendition.

At about the same time, fellow modeler Jim Whitehead offered me a track plan he had sketched out during a cross-country flight. Thus, my railroad was actually designed at 30,000 feet. It combines continuous loop running for display purposes with a hidden staging yard, several industrial switching areas, and a number of other operating features for ongoing interest. Construction of the layout without a name began in May 1990.





## Layout construction

I wanted a walk-in arrangement free of duck-unders. Jim's plan fit my line of thinking with a dogbone arrangement, folded into a horseshoe shape. The main line runs all the way around the layout twice before it returns to the starting point. It also features a hidden staging yard. I used L-girder construction, 1x4 risers, and 1/4" plywood as a sub base for track.

Before laying the track I used white glue and push pins to secure the cork. After the glue set, I removed the pins and smoothed the cork surface with a sanding block before installing the track with contact cement.

All of the original track is Peco code 80 mounted on cork roadbed. My friends and I installed the branch line later, using code 55 track. I used Peco Electrofrog turnouts on the main line and Insulfrog turnouts for the yards. Then I ballasted the track with Woodland Scenics ballast. I used matte medium to cement the granules in place.

## Enter the Montana Rail Link

Two important events in 1994 influenced my choice to model the prototype

Montana Rail Link RR (MRL). First, I'd begun to notice the MRL as an interesting regional railroad, and I liked its plain but colorful paint scheme and the diverse scenery.

Today's prototype MRL operates more than 600 miles of main line over the old Northern Pacific right-of-way and has another 300 miles of branch lines. Between Spokane, Wash., and Sandpoint, Idaho, MRL operates on running rights over the BNSF Ry. (Burlington Northern in 1994) and from there to Jones Junction (just east of Billings, Mont.) on its own track.

The second event was my younger son's marriage and decision to move from Massachusetts to Idaho, where my new daughter-in-law grew up. After a visit to scenic Idaho and Montana, I was hooked.

## An emerging concept

As the layout matured over the last 15 years, my operating concept has also evolved to provide more realism. The named towns along the main line now appear in the proper geographical order, and my railroad operates in an east-west orientation.

3. The dispatcher's panel for the MRL includes the EasyDCC command station (lower left), eight lighted panels that indicate local turnout positions, and a magnetic straight-line diagram (bottom) that holds train location tags.

Trains originate off-line (in staging) from either Spokane, Wash., or Laurel, Mont. The towns in my modeled portion of the railroad are actually located between Missoula and Logan, Mont.

The real life MRL is a bridge route that doesn't generate enough carloads on-line to support the type of operations I wanted. My solution was to add some freelanced industries. Unlike the prototype, my MRL serves an on-line coal mine and a power plant that are as a "loads-in, empties-out" operation. Coal travels to the power plant, and the empties return to the mine. Upon delivery, these cars pass through a pair of concealed tracks to reappear at the proper places on the opposite sides of the backdrop to begin another cycle.

A junction with the Montana Western at Garrison, Mont., is the start of my branch line. Ownership of the MW changed in July 2003, so this may require a prototype research trip.



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(Spokane, Wash.)

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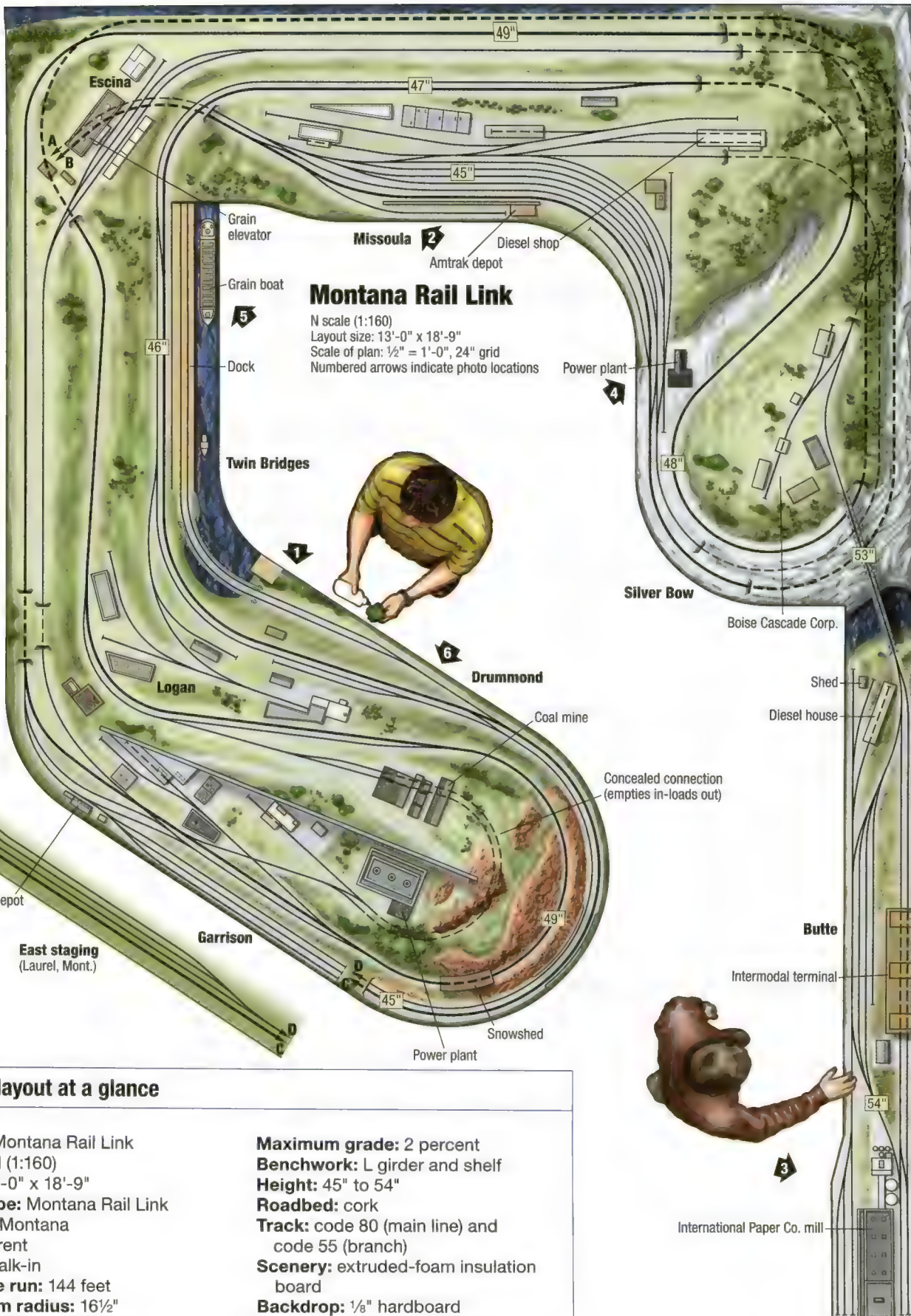
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## ► The layout at a glance

**Name:** Montana Rail Link

**Scale:** N (1:160)

**Size:** 13'-0" x 18'-9"

**Prototype:** Montana Rail Link

**Locale:** Montana

**Era:** current

**Style:** walk-in

**Mainline run:** 144 feet

**Minimum radius:** 16½"

**Minimum turnouts:** Peco long-  
(main) and medium-radius (yards)

**Maximum grade:** 2 percent

**Benchwork:** L girder and shelf

**Height:** 45" to 54"

**Roadbed:** cork

**Track:** code 80 (main line) and  
code 55 (branch)

**Scenery:** extruded-foam insulation  
board

**Backdrop:** ⅛" hardboard

**Control:** CVP Easy DCC Digital  
Command Control

International Paper Co. mill

Illustration by Rick Johnson





## The control system

As the railroad progressed, I needed to decide between cab control or DCC (Digital Command Control). With the improvement of decoders for N scale models, I opted for the much simpler wiring of DCC, using a CVP Products EasyDCC system.

Rail gaps and feeder wires were already in place for cab control, so it was easy to rewire them into DCC power districts. The districts are protected by DCC Specialties Power Shields, and I used 3M ScotchLok Auto-Tap 905 connectors to attach the feeder wires to the power buses.

**4. Burlington Northern Santa Fe EMD and GE units team up to haul Montana coal through a canyon. The nearby river provides great fishing, as well as fast moving water for the turbines at the Montana Hydropower plant.**

Circuitron's Tortoise motors power all of the MRL's turnouts. The motors' two single-pole double-throw (SPDT) contacts are wired to route power to the frogs to ensure reliable operation. Toggle switches on local panels control most of the turnouts, and all mainline turnouts have position indicators on the dispatcher's panel. Double track crossovers and hidden yards are oper-

ated by stationary decoders controlled by push buttons on the same panel.

The yards operate with tethered throttles, and we often have as many as three or four locomotive consists operating in, or passing through, a town. Just as in real life, the dispatcher and the engineers are responsible for keeping the trains separated.

## Train operations

An operating session uses a crew of seven people. They're assigned to work as a dispatcher, three yard operators, and three road engineers.

Each operating session involves two "sweeper" trains that run from Spokane to Laurel (SL) and from Laurel to Spokane (LS). These key trains move cars between the yards, as well as take some traffic off line (staging). Though these trains are off line, the car waybills are rotated to show new destinations when the train returns for its next run.

Two local jobs work as "turns," originating in Missoula, switching several towns, and returning to the yard. Another pair of turns work out of Butte to serve the MW Branch.

Other mainline traffic includes Amtrak Superliner passenger trains, unit coal trains, a Boeing Aerospace "plane train" and a double stack intermodal consist. We're currently on our fourth revision of the operating schedule, and it's likely to continue evolving, since we're still finding new reasons to add occasional extra trains.

We use a car-card-and-waybill system that Jim Whitehead originally developed for his own layout. It's similar to other card systems, but includes his own personal touches. We use Microsoft's Access database and Publisher programs to create our own car cards and waybills.

We now have three local N scale railroads using this system, and we interchange cars between our railroads just like the real railroads do. It's great fun to find your rolling stock in a train on a friend's railroad. Interchanging cars certainly adds to the feeling of fellowship that I enjoy with the key players on my crew that I call the "Gang of Five." [See the next page. – Ed.]

## Future plans

With the layout essentially complete, where do I go from here? I like contemporary railroading with big locomotive consists and long trains. I admire Eric Brooman's Utah Belt concept of staying current, so one project moving to the front burner is modeling MRL's new SD70ACes. I could wait for the first N scale model, but I keep wondering if I





5. On this clear morning, the passengers traveling on Amtrak train 52 are getting a good view of the waterfront. Once the covered hoppers are spotted, the dockworkers at Twin Bridges will be busy transloading grain to the bulk carrier *Jessica E.* Ernie built the ship from a Sylvan Models kit.



6. A freshly loaded BNSF unit coal train prepares to leave Hoven mine with a pair of SD70s in the lead. In the meantime, MRL's daily train LS is leaving Logan, Mont., at the lower left. Its venerable SD9s will switch industries at Garrison and Missoula during the day, before tying up at Spokane in the evening.

could start with a Kato SD70ACe diesel and produce a believable model in MRL dark blue?

I also enjoy exploring the latest in technology. We have recently installed Decoder Pro software. Decoder Pro is Internet freeware ([jmri.sourceforge.net](http://jmri.sourceforge.net)) that can be used to control trains with graphic throttles and program DCC decoders. All the decoder settings can be saved, so computerized reprogramming becomes a snap.

My friend Peter Wisniewski has modified a Kato Amtrak P42 locomotive with a hidden camera. It can be operated with a graphic throttle, allowing an entire Amtrak Superliner trip to be viewed and controlled, side by side, on the computer.

I've also thought that adding another staging yard would allow me to keep more trains on the layout at the same time. And I want to add a unit grain train. I have a feeling that my list of



## The "Gang of Five"

The MRL's "Gang of Five" have all played major roles in building and operating the MRL railroad. The gang includes Rand Hoven, Jim Whitehead, Peter Wisniewski, Ernie Poole, and Ed Smith.

**My participation** in the hobby has produced many strong friendships. The railroad that I call my Montana Rail Link was built with plenty of help from my friends Jim Whitehead, Ed Smith, Peter Wisniewski, and Rand Hoven. Collectively, we're known locally as the "Gang of Five."

Jim designed the track plan, built structures, and worked on scenery and backdrop painting. Ed works on scenery, trackwork, and problem solving. Peter is our electronics expert, locomotive maintenance man, and top storyteller. Rand has done structures and scenery work, but also serves as our schedule planner and dispatcher. My role is to obtain supplies, answer questions, and keep out of their way!

These guys deserve a lot of credit for their tireless contributions to the layout. Each of them are responsible for important aspects of seeing this railroad to completion. A few new operators have recently joined our group, but who could have guessed that the original gang would still be going after 15 years of Thursday night meetings? — E.P.

things to do with the layout will get longer over time, rather than shorter. Maybe that's the way it ought to be. Good things don't always have to come to an end. **MR**

*Ernie Poole is a veteran modeler who started out sharing the hobby with his dad. He's a retired IBM software service engineer. He and his wife, Cindy, have been married for 46 years and have two grown sons and seven grandchildren.*



# Roll your own steel coils

A common open load that travels between steel mills

By Bruce Dombey  
Photos by the author

**H**heavy coils of steel are common loads that railroads transport in great quantities. Both rough and finished coils travel by rail, but the ones we're concerned with here are what's called hot rolled bands. These bands are long strips of thick steel that mark the end of the first step in the production of sheet metal.

Each band starts out as a slab of red-hot steel, 6" to 8" thick, that must be heated to an even temperature. Then it begins its journey through the hot strip mill where immense pressure is applied to reduce the thickness of the slab. As the slab moves back and forth, each pass between the rollers makes the metal strip (or band) thinner and longer. It also picks up speed as it gets progressively thinner and longer.

When the band's specified thickness is reached, usually about  $\frac{1}{4}$ ", the still-hot strip is routed into a coiling machine. The coil is then fastened with high strength steel strapping to maintain its size during shipment, as well as make it easier to handle. A hot coil will normally be secured with only one or two straps since there is little tendency for a coil of thick steel to unwind. Each coil is also marked with an identification number. My finished model coils are shown **fig. 1**.

Each of the hot bands weigh about 30,000 to 35,000 pounds, so care must be taken to avoid exceeding a gondola's capacity. A special C-shaped crane hook slips into the eye of the coil to lift it. Since the metal has an untreated, rough, and rusty surface, there's no need to cover the coils during transit.

## Modeling hot coils

Hot strip mills are rated by the maximum band width they can roll, typically between 44" and 84" wide. These steel bands are made to exact customer specifications, so I make mine in 36", 42", 48", 54", and 60" widths.

Each band is rolled from a single slab which produces coil sizes ranging between 60" and 80" in diameter. Shipments of similar size coils are common, but I prefer a little variation to represent different orders of steel.

Modeling hot coils is easy, and it only requires a few readily available materials. I use strips of Paper Reflections brand cardstock to represent the steel bands. It's sold in 25-sheet packages, 12" square, at craft stores.

I model in O scale, so I use several full-length strips of cardstock in each



**Fig. 1 Hot steel bands.** Hot-rolled bands or strips of thick steel sheet are made into heavy coils and secured with steel strapping for shipment. They come in a variety of sizes that match customer specifications for the next processing step.



coil. Modelers working in HO scale will use fewer strips. My initial step is to use a fresh hobby knife and a steel rule to cut a sheet of cardstock into appropriate-width strips, being careful to maintain the same width for the entire length of each strip.

### A standard mandrel

The standard coil eye diameter is 24", so I made a winding mandrel out of ½" dowel for O scale. [For HO scale coils, use a ¼" dowel. – Ed.] Then I used a razor saw to cut a square slot into one end of the dowel, as shown in **fig. 2**.

To wind a coil, I slip one end of the cardstock strip into the slot and rotate the mandrel while maintaining pressure on the strip to keep it taught. After the first wrap, I apply a dab of glue from a glue stick and hold the paper in place for a minute or so until the glue sets. I continue rolling the coil until I reach the far end. Then I apply a little more glue and butt the end of the next strip tightly to the first.

As I continue rolling, I try to keep the edges aligned as evenly as possible. Slight variations are fine, as these hot band rolls tend to be a bit ragged anyway. Before I apply the final strip, I trim its outer end into a rounded shape to represent the end of the hot rolled strip. I apply the last of the glue about a scale foot or two from the end of the strip, so that the rounded end can lift up a little.

### Painting and weathering

A hot band turns to a dull, dark bluish-gray color as it cools. But this seldom lasts for long because the dry steel surface immediately begins to develop an even layer of rust. The longer the band is in storage or transit, the more rust it accumulates. However, this isn't a problem since the first step at the finishing mill is to clean and oil the heavy band in preparation for cold rolling it into thin gauge sheet steel.

To simulate this finish, I airbrush the coils with Polly Scale Rust or Steel colors. When the paint is completely dry, I brush on a generous coat of black powdered pastel over both colors. Then I apply a layer of rust-colored pastel over the "steel" painted rolls to simulate recent arrivals that haven't been in storage for long. Note that I don't apply any fixative over the chalk since it reduces the dusty effect I want.

### Steel strapping

The steel strapping may be applied around the circumference of the coil or through the eye, and heavy coils may be strapped in both directions. My preference is for strapping that's applied



**Fig. 2 Rolling mandrel.** A homemade mandrel, made from a dowel rod with a slot cut in one end, makes it easy to roll your own steel bands using cardstock to represent the heavy steel strips. The glue holds the paper in a tight coil.



**Fig. 3 Shipping cradle.** A simple cradle, made of steel angles welded to plates bolted to the gondola's floor, holds the coils in transit. Pairs of heavy timbers are often used in a similar manner to secure the coils in cars with wood floors.

through the eye, as seen in **fig. 3**., since it prevents telescoping if the load shifts from a hard impact.

The prototype strapping consists of a steel band that's secured by a steel locking clamp (seal). A tensioning machine pulls the strapping tight around the coil, and then the seal is crimped in place to secure the strapping.

I simulate the strapping by using 1½" wide strips of black construction paper. I glue the ends of the strap into the middle of the coil's eye. [Narrow chart tape also works well to simulate steel strapping. – Ed.] Once the glue sets, I trim off the excess strapping. Next I add a seal made from a bit of

colored paper glued to the strap. I also apply a load tag made from a piece of buff-colored paper, as shown in **fig. 3**.

My last step is to apply the roll's hand written (chalk) identification code. For this I use a cream-colored pencil to write a six-digit number near the end or on the side of the band.

Hot coils are shipped to finishing mills in open gondolas, usually with one or two coils set into a cradle over each truck. **MR**

*Bruce Dombey is a veteran modeler who works in the steel industry and enjoys building O scale models of heavy industry. He lives in Portage, Ind.*



# A B&O branch line for a GARAGE



This plan for a 10 x 18-foot layout is based on operations in the Shenandoah Valley

By Michael Flanagan

**A**fter years of living in lower Manhattan, I recently moved from New York to a small farmhouse in Connecticut. The rural locale of my new home was a welcome change, and I relished the converted garage that includes my studio and enough space for the layout design presented here.

This HO scale layout was influenced by Baltimore & Ohio RR operations through the Shenandoah River Valley circa 1953. The prototype Shenandoah Subdivision begins at a switch that diverges from the B&O (now CSX) main line on the Maryland side of the Potomac River bridge at Harpers Ferry, W.Va. The northern end of this route opened in 1836 as the Winchester & Potomac RR. Under B&O control in 1870s, the W&P was con-

Baltimore & Ohio's no. 4592, a 2-8-2 Mikado, is typical of the steam power working the Shenandoah Subdivision. Jim Shaughnessy photo

nected with the newly built Winchester & Strasburg RR. That formed the present line, which runs roughly 50 miles in a southwesterly direction through the farm country of the lower valley to Strasburg Junction. The junction includes a wye interchange with the Southern Ry.'s Manassas-to-Harrisonburg line.

Rather than attempting to model the entire subdivision, I developed my plan to highlight several key elements and locales along the route. On this point-to-point plan, the fictitious community of Shenandoah Springs occupies the same spot on the map as the actual city of Winchester, Va. I intentionally designed "The Springs" to be a smaller and hillier locale than Winchester. Additionally, Lime City and Mount Zion are also fictitious locales that I developed from elements found in Stevens City, Strasburg, and Mount Jackson.

From a modeler's perspective, it's hard to find much visual inspiration in the drab corridor of factories and houses scattered along the B&O tracks that route straight through downtown Winchester. Judging from historic pho-

## ▶▶ The track plan at a glance

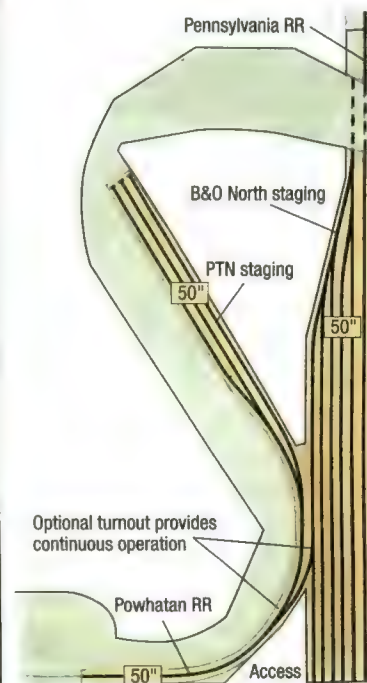
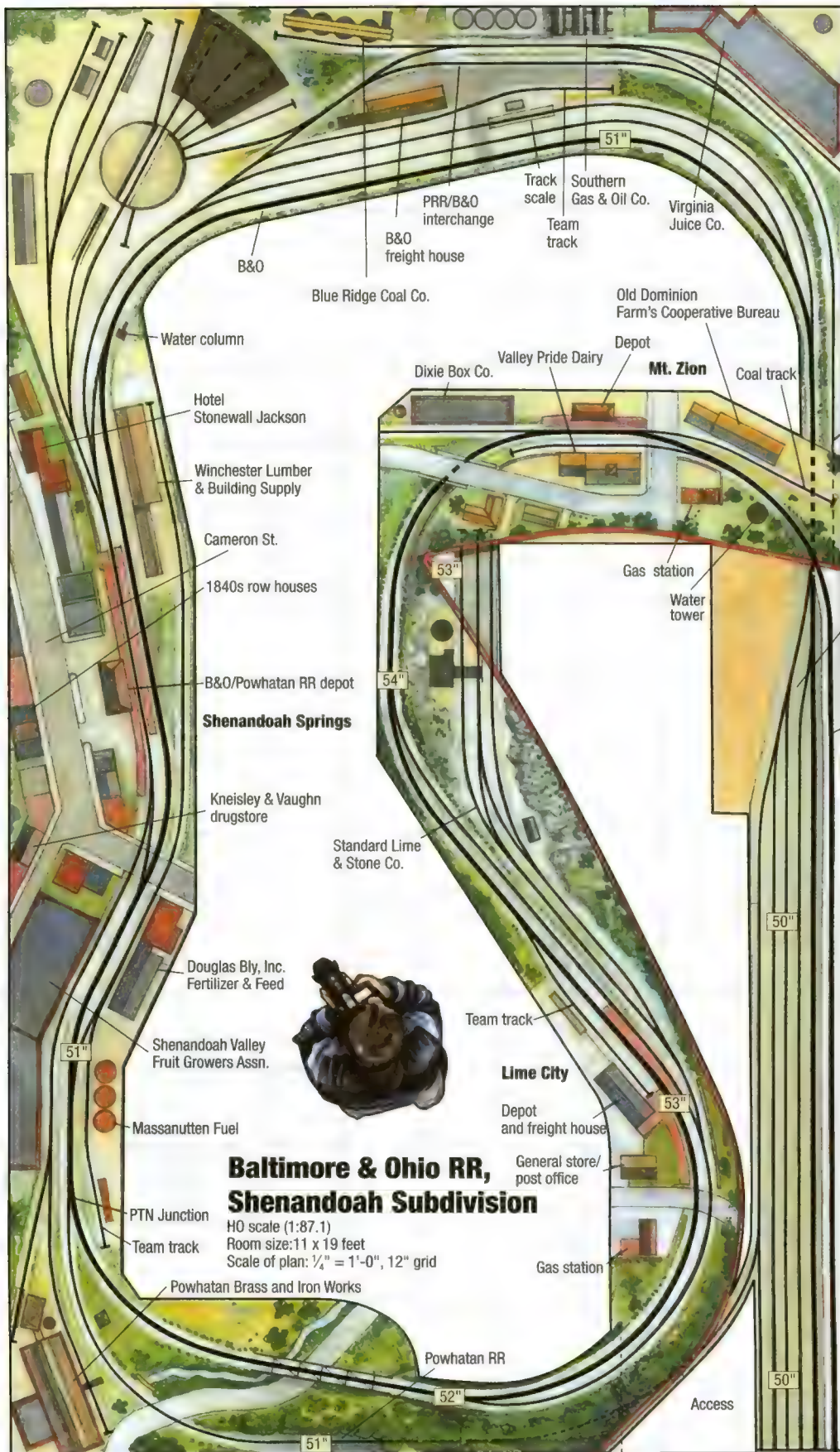
**Name:** Baltimore & Ohio RR, Shenandoah Subdivision  
**Scale:** HO (1:87.1)  
**Size:** 10'-8" x 18'-6"  
**Prototype:** B&O  
**Locale:** Virginia  
**Era:** 1953  
**Style:** walkaround  
**Mainline run:** 50 feet  
**Minimum radius:** 27" main line, 24" in engine terminal and leads to PRR switching track  
**Maximum grade:** 1.5 percent  
**Minimum turnout:** no. 6, except where noted

tographs, the area appeared to be no more photogenic in the 1950s, a time when many original structures were still standing. Fortunately, the free-lanced prototype locales on the plan make it possible to vary the placement and condition of structures near the track, without detracting from a town's original function and character.

I made my town of Shenandoah Springs much more compressed than the actual town of Winchester. On my plan, the B&O runs through town on three curves instead of the straight shot taken by the prototype. I also took Winchester's numerous sidings, turnouts, and trackside industries and reduced them to a manageable quantity. However, I was able to include the B&O's interchange with the Pennsylvania RR's Cumberland Valley route from Hagerstown. This track runs through the top of the plan near the roundhouse.

I also included a connection for the fictitious Powhatan RR (PTN), which is a short line I based upon the prototype Winchester & Western (W&W). Following prototype W&W practice, PTN trains loaded with glass sand from a quarry at Gore, W.Va., connect to the B&O south of Shenandoah Springs and then continue north a short distance on the B&O to the Springs yard.



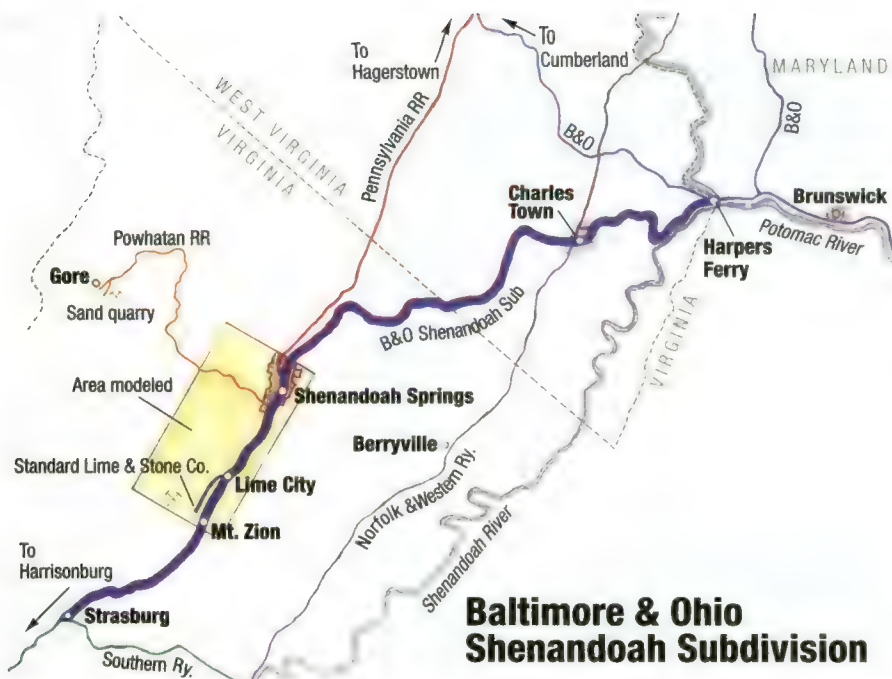


Illustrations by Michael Flanagan

Room entry (duckunder)

To Strasburg staging





## Baltimore & Ohio Shenandoah Subdivision

### Surveying the subdivision

Before settling on the Shenandoah Subdivision, I spent years studying other B&O branches or related lines, including the Cumberland & Pennsylvania, the Buffalo Creek & Gauley, and B&O's Washington County Branch. I finally chose to develop the Valley Sub because it offered so many of the features I desired in a model railroad.

**Variety of traffic.** During the 1950s, limestone was shipped out of the region's quarries by rail aboard covered hoppers, open hoppers, gondolas, and even boxcars loaded with bagged lime for agricultural use.

Winchester was also an enormous apple and fruit producer, so the layout will require a fleet of wood-sheathed reefers to handle seasonal produce.

Other rail traffic in the valley included grain, textiles, coal, and fuel oil.

**Short passenger trains.** By the late 1940s B&O passenger service in the Valley was down to one train, Nos. 54 and 55, a daily local that ran from Brunswick, Md., to Strasburg and back – often with just a milk car, baggage-Railway Post Office and a paired-window A-18 coach in tow. Service was discontinued in August 1949, but extended to 1953 on my model railroad.

**Interchange.** The B&O's Valley Sub interchanged with four railroads. My track plan incorporates two – the PRR and the Powhatan.

**Mixed motive power.** Steam still ruled on the Shenandoah Sub in 1953. Electro-Motive Division GP7s began showing up in Winchester late that year. My layout will include both. Local B&O freight was mostly handled by E-27ca

Consolidations. Mikados, both Q-1 and Q-7 classes, were used on longer trains, since the B&O's Q-4 engines were too heavy for the 85-pound rails south of Harpers Ferry, W.Va.

**Regional architecture.** Shenandoah Valley towns display a variety of architectural styles unique to the area. They may include freestanding Pennsylvania-German stone houses or classic brick row houses of the Federal Period.

Winchester's largest industry can be identified by its ungainly architecture. Virginia Apple Storage, ZeroPak, Robinson's, and Winchester Cold Storage occupy huge windowless warehouses made of brick and concrete.

**Modest scenery.** In most mid-Atlantic states, the railroad right-of-way is more prosaic than spectacular. Once it leaves the valley of the Potomac, the B&O line to Strasburg is flanked by orchards, woods, and farms dotted with limestone outcroppings.

The track runs down the center of a geologic trough parallel with Little North Mountain, featuring forested slopes that could be rendered on a backdrop.

### Tour of the track plan

Unlike most rivers in the eastern U.S., the Shenandoah flows north, toward the Potomac. Due to this geographic quirk, B&O trains travel south as they head "up" the Shenandoah Valley. On the layout, this gradual climb is reflected in the 1.5 percent grade from PTN Junction to Mount Zion. The grade is needed to provide the 5" clearance between upper- and lower-level staging.

Within Shenandoah Springs, at the midpoint of the plan, the main street

curves uphill toward the backdrop, but the trackside area is mostly level. Here I added a three-stall roundhouse to service Powhatan and B&O motive power.

Beyond Shenandoah Springs, southbound B&O trains pass from meadow to woods. At this point westbound Powhatan trains disappear behind a screen of trees on their way down to PTN staging under Lime City. The ravine, inspired by Tom's Brook on Southern Ry.'s line south of Strasburg, will be spanned by a 150-foot through-truss bridge.

Although the plan is designed for point-to-point operation, there is a provision for continuous running. Intended primarily for locomotive break-in and testing, the addition of a hidden turnout under Lime City introduces a connection between the Powhatan RR and B&O North Staging.

Mount Zion, among the smallest hamlets on the Shenandoah Subdivision, has a farmers' co-op elevator and a depot. For operating interest I've added a dairy, although most milk was being shipped out by truck in 1953.

The B&O east and westbound staging yards are stacked above each other inside the peninsula, with a 5" separation rail-to-rail. On the lower level, a single track against the wall is enough to handle cars switched by the PRR. Additionally, the concealed Powhatan staging tracks under the quarry scene at Lime City are accessible from the work space inside the peninsula.

Though the distance represented by this subdivision isn't long, there is plenty of opportunity to include a variety of scheduled trains, ranging from B&O freight locals and passenger service to Powhatan RR turns and weekend-only Brill motorcar operation. **MR**



### Meet Michael Flanagan

Michael Flanagan is an artist, writer, and college teacher. His novel *Stations* was published in 1994 by Pantheon Books. A longtime resident of Lower Manhattan, Flanagan moved to Lyme, Conn., three years ago to a farmhouse he shares with his wife, Sharon.



With each switch motor automatically triggering the next motor down the line, an operator can line all the turnouts to select a route in or out of a yard with a single rotary switch.

# Easy yard ladder control

A “tree” of slow-motion switch motors simplifies yard routing

By Oliver Tansey

Photos by Jim Forbes

**F**or many years, modelers have wired switch motors with diodes to line multiple turnouts in their model rail yards. But wiring a yard full of switch machines with diodes can get complicated – and expensive.

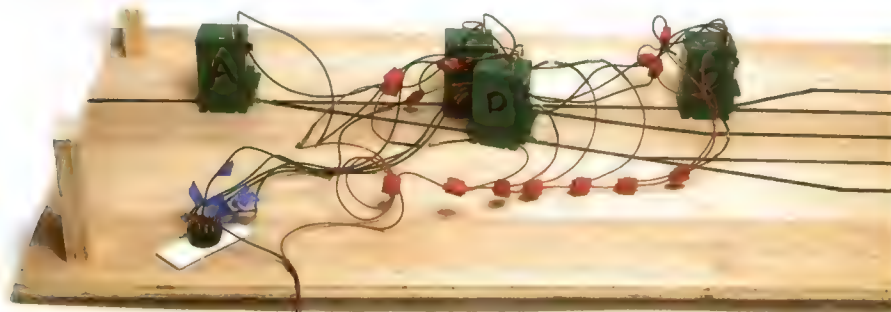
For example, I was recently asked to draw up a diode matrix diagram for a modeler's 11-track staging yard. Using Tortoise switch motors and a single rotary switch for route selection, the circuit would have required a staggering 87 diodes!

Don Lancaster, author of a series of books on electronics, has a philosophy: If the obvious solution to a wiring problem has a high parts count, the chance is good there's an inobvious solution that uses fewer parts. So I began wondering if there was a much simpler way to control multiple turnouts powered by Tortoise motors.

There is, and I call it the Dendritic Control System. The word “dendrite” comes from Greek and means a branching structure. I named it not only for

the tree-like arrangement of most rail yards, but also for the fact that, like a tree in the wind, the “branches” in my system move the “trunk.”

The system comes in two versions. The simplest version uses single-pole, double-throw switch contacts on each Tortoise. If your switch motors have no such contacts, or if they are in use for



Controlling large yard ladders can be expensive and complicated. Oliver Tansey's Dendritic Control System uses the internal contacts of the Tortoise switch motor to take the place of a lot of diodes and complex wiring.

Fig. 1: Tortoise wiring, variation A

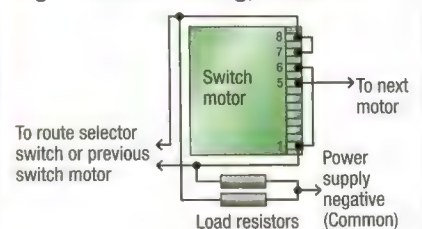




Fig. 2: Sample yard arrangement, variation A

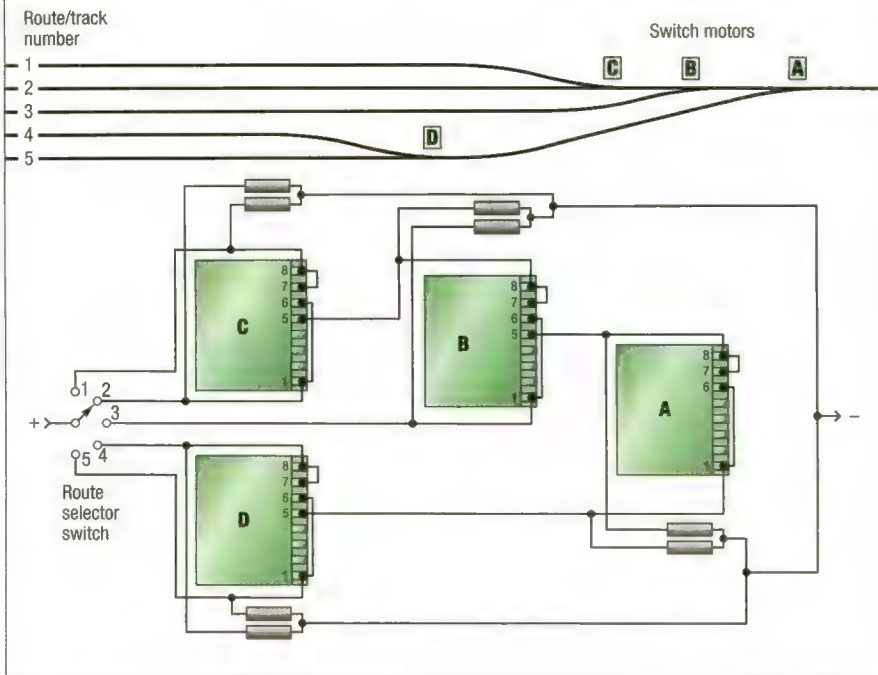
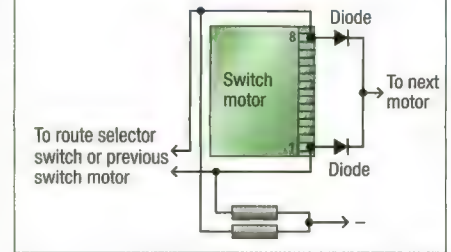


Fig. 3: Tortoise wiring, variation B



drop the supply voltage by slightly less than half.

• The wiring diagrams assume that positive voltage applied to terminal 1 moves its connected turnout to the normal position, and positive voltage on terminal 8 moves the turnout to the reverse position. If your switch motors work the other way, reverse the wires to terminals 1 and 8 only, leaving the other wires as shown.

### The easy way

Dendritic A is a simple system. Each switch motor is wired the same way, as shown in **Fig. 1** on the previous page.

Note that if terminals 5, 6, and 7 are already in use, you can use terminals 2, 3, and 4. Terminal 2 should be connected to 8, 3 to 1, and 4 is the output to the next machine.

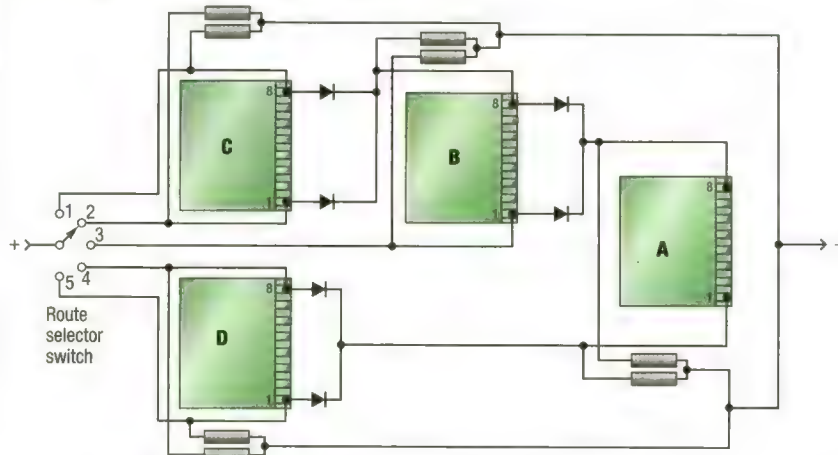
Once each Tortoise motor is wired as shown, they are connected to each other in a "cascade" fashion following the track and turnout arrangement. **Figure 2** shows a sample five-track yard ladder with four turnouts and how to wire it with the Dendritic A system.

The route-selector switch energizes the last motor on the selected route, with power flowing through the switch motor and out through one of the resistors. Once the mechanism moves about halfway, the internal switch makes contact, and current flows to the next motor in the tree. The sequence repeats until the selected motors have aligned all the turnouts.

Tortoise contacts are rated at 1 amp, so each Tortoise could in theory switch 18 others. That's a big yard!

Though a rotary switch is the most straightforward way to select a route, you could use any single-pole single-throw (SPST) switches, including slide or toggle switches. If such individual switches are used and two switches are thrown at once, no harm is done. This would result in voltage of the same polarity being applied to both terminals 1 and 8 of a switch motor, so no current would flow, and the motor wouldn't move until the incorrect switch was turned off.

Fig. 4: Sample arrangement, variation B



Note: for same track arrangement as in Fig. 2

Illustrations by Rick Johnson

another purpose, variation B (seen in **Fig. 4**) uses no internal contacts, but requires two diodes per turnout.

### The basics

Here are some principles common to both versions:

- The system is designed for slow-motion switch motors that stall at the end of travel. My diagrams and formulas are meant for Tortoise switch motors from Circuitron.
- The system uses a constant-voltage power supply of 12-14 volts DC.
- The motor terminals connect to the power supply negative (common) wire via two inexpensive load resistors.

Applying positive voltage to the switch motor's terminal 1 or 8 energizes the motor, and the resistors "steer" the current to common. The resistors add about 20mA to the current required per turnout.

- For Tortoise motors powered by 12 volts, the resistors should be rated at 560 ohms and 1 watt. [The value of a resistor is color-coded in a series of bands; the first three bands of a 560-ohm resistor's bands are green, blue, and brown. — Ed.] Other brands of slow-motion switch motors will require experimentation to find the correct resistor value to use. At the stall current of the switch motor, the resistor should



## A bit more complex

Version B is for switch motors that don't have any internal power-routing switches (such as those from Hanks-craft), or for situations where both sets of contacts are already in use (to control signals, for instance). This system does have some drawbacks, though, as we'll see shortly.

The connections to the selector switch are the same as in **fig. 2**. However, power is routed to the next motor using diodes instead of internal contacts. The diodes, which are one-way gates for electricity, prevent current from feeding back to the wrong machine as well as eliminating a dead short across the motor. Any diodes rated at least 50PIV (Peak Inverse Voltage) and 250mA can be used; 1N4001 diodes are perfect. See **Fig. 3** for how to wire the individual switch motors.

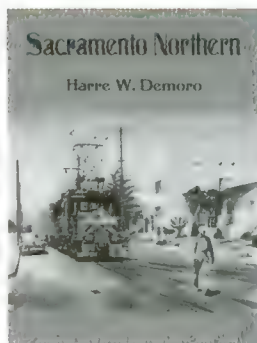
Each diode drops the supply voltage by 0.7V, which means that in our sample arrangement shown in **Fig. 4**, motor A will receive 11.3V in route 3, 4 or 5, but only 10.6V in route 1 or 2.

Since Tortoises can operate on 9 to 12 volts, this difference won't affect operation in this arrangement, but it can be a problem with larger yard ladders. Even in smaller setups like our example, a given Tortoise may operate at different speeds when different routes are selected. There is a way to wire around this, but it's more complex and requires more diodes, making Dendritic Control less attractive.

So from a practical viewpoint, version B is only feasible for ladders with two to three turnouts in a row. A simpler way would be to attach a single-pole double-throw (SPDT) micro-switch to each motor so that it is activated by the moving arm of the motor. As the arm moves, it trips the switch, routing power to the next motor as in the Dendritic A system. True, the switches add to the cost, but so would the diodes for version B.

Either system will reduce control panel complexity and increase flexibility. Unlike diode routing, changes in track layout can be accommodated easily by changing the wiring of the switch motors. **MR**

Oliver Tansey began his first model railroad (HO scale) in 1975. He switched to O scale in the late '80s, then to 1/2" scale narrow gauge in 2001. His interest in the True-Action Throttle v. III (TAT III) got him interested in electronics and integrated-circuit technology. Oliver describes himself as a self-taught repair specialist, inventor, experimenter, designer, engineer, and realist.



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Re-creating prototype grain industry scenes, such as this one in Harwood, N.D., is easy with the right structures and freight cars. Cody Grivno shares tips for modeling the grain industry on your model railroad. Andy Cummings photo

# DIESEL ERA GRAIN OPERATIONS

From sprawling elevator complexes to covered hoppers, this industry offers a variety of modeling opportunities

By Cody Grivno

**A**re you a freight car fan? Do you enjoy building structures? Then modeling diesel era grain operations might be up your alley.

Freight car modelers will enjoy the grain industry for its diverse fleet of covered hoppers, some of which are shown on page 62. Though Pullman-Standard and American Car & Foundry

are the best-known builders of covered grain hoppers, smaller freight car manufacturers produced a variety of hoppers that are still in service today.

Structure enthusiasts will find a wealth of modeling opportunities in the grain industry. Most modern elevators are built from corrugated metal or concrete, though examples of older

wood-crib structures can still be found throughout rural America. Thanks to the large number of mass-produced elevator kits available in HO and N scales, you can easily kitbash them to get your favorite prairie skyscraper.

From the large assortment of covered hoppers to the hundreds of styles of elevators, the grain industry offers



plenty of modeling diversity. If you need a big industry for your model railroad, why not consider grain?

### Types of elevators

Not all grain elevators are alike. For example, the Farmer's Co-op Elevator on Tom Johnson's HO layout shown in **fig. 1** is a country, or collection, elevator. Farmers bring harvested grain to these locations in trucks. Though these elevators are often simple affairs, some are equipped to clean and dry grain.

Terminal elevators, such as the one in **fig. 2**, have larger storage capacities and can handle much more grain than country elevators. At these locations, grain is cleaned, dried, and blended. Though most terminal elevators are located inland and receive shipments by both rail and truck, some are found along rivers and the Great Lakes. At the latter, grain is also shipped and received in barges and lake boats.

Export elevators, such as Continental Grain Co. shown in **fig. 3** on the next page, are a sub-type of terminal elevators. Grain collected here is loaded into ships for export overseas.

One hallmark of terminal elevators is the number of tracks. Most collection elevators have two or three tracks, but terminal elevators need sufficient room for inbound loads and outbound loads and empties. Prototype terminals receive unit grain trains, ranging in size from 25 to 110 cars.

### Getting the covered hoppers

When an elevator is ready to ship grain, it has to order covered hoppers from the railroad. Most railroads prefer a lead time of seven days to ensure the cars are available and can be delivered on the desired date. Additional lead time is required during the harvest season.

Though railroads still accept single-car orders, they give price breaks to elevators that can ship numerous carloads at once, in what are called unit trains. On the BNSF Ry., there are single units (24-27 cars), double units (48 cars), and shuttle trains (110 cars).

Once the hoppers arrive at the elevator, they need to be loaded in a specified period of time. If the elevator fails to do so, it has to pay demurrage charges, which are fees assessed by the railroad for not loading (or unloading) cars on time. The charges are per car, so the fees can add up quickly.

Though setting out hoppers at most elevators is straightforward, in some instances specific instructions must be followed. The example shown in **fig. 4** on page 61 is from a Burlington Northern car-spotting booklet for a branch line in



**Fig. 1 Collection elevator.** Tom Johnson's freelanced HO scale Logansport & Indiana Northern (see *Great Model Railroads 2008*) features more than a half dozen elevators. Farmer's Co-op Elevator in Bruce Lake, Ind., is an example of a collection elevator, where nearby farmers deliver their grain in trucks for shipment by rail or long-haul tractor-trailers. Jim Six photo



**Fig. 2 Terminal elevator.** Grain from collection elevators is shipped to larger elevators, such as Santa Fe's Elevator "A" in Kansas City, Kan., on Chuck Hitchcock's HO scale Argentine Industrial District layout. Terminal elevators have more tracks than collection elevators because of the large number of inbound and outbound shipments. Chuck Hitchcock photo





**Fig. 3 Export elevator.** Continental Grain Co., seen here on our old HO scale Milwaukee, Racine & Troy club layout, was located on the banks of the Menomonee River. Grain

from export elevators is loaded into ships for transport to foreign countries. An article on this elevator appeared in the November 1986 issue of *Model Railroader*.

## Modeling tips

**Making your elevator complex** look and work like the real thing requires attention to detail. Here are some tips for making your scene as accurate as possible.

**Use multiple structures.** At minimum, a scene should include the main elevator, an annex (concrete silos or steel bins), and a scale for weighing trucks. Don't forget to add details such as piping, grain legs, and assorted platforms, conveyors, and stairways.

**Have a sufficient switching lead.** Let's say you have two sidings in front of your elevator that can hold six cars each. The lead should long enough for the two cuts of cars to be swapped without fouling the main.

**Use industry-appropriate vehicles.** Athearn and Walthers both produce grain trucks that are typical of those seen at country elevators. Lonestar Models offers Wilson grain trailers that are ideal for terminal elevators.

**When in doubt, do research.** There are numerous modeling resources available on grain. *The Model Railroader's Guide to Industries Along the Tracks* by Jeff Wilson includes a chapter on the grain industry (and a list of available kits in HO and N scales).

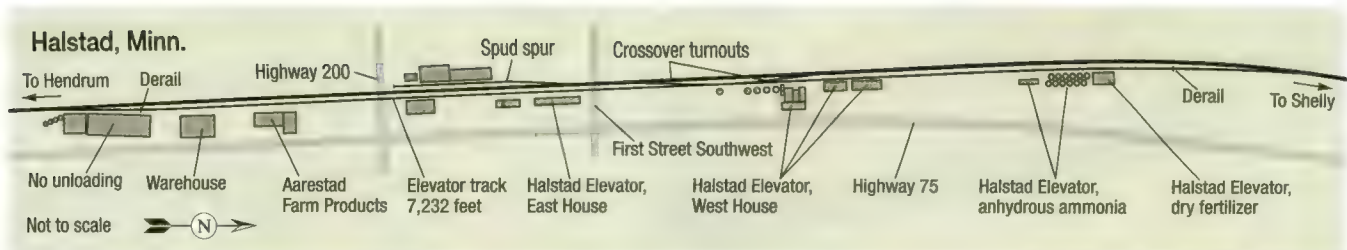
The Model Train Magazine Index ([index.mrrmag.com](http://index.mrrmag.com)) will direct you to articles that have appeared in model and prototype publications. I did a keyword search for "grain" and it returned more than 120 articles. — C.G.

northwestern Minnesota. At Halstad, a 52-car unit train is pulled into the elevator spur at the west (north) switch. Twelve cars are spotted west of the First Street Southwest crossing, 10 are set between the crossing and highway 200, and the balance of the train is left east (south) of the highway 200 crossing.

Retired BNSF Ry. conductor Robert Anderson worked trains that served the Halstad elevator. He said the elevator used a front-end loader with a railroad coupler welded into the bucket to switch cars. When the cars needed to be moved for loading, Robert said, "They pulled some of the loads toward the main line at the crossover. We think they might have opened one of the main line crossover switches, as the south car that was spotted wasn't the same car when we picked [up the unit train.]"

Obviously, not every elevator has special switching instructions like the one in Halstad. However, you can adapt situations like this to add realism to the operations on our layout.





**Fig. 4 Prototype setouts.** Real railroads have special instructions for setting out cars at certain elevators. At Halstad, Minn., Burlington Northern crews had to cut 52-car unit grain trains into three sections to clear two grade crossings.

Illustration by Rick Johnson

### Covered hoppers

In the 1960s, freight car manufacturers revolutionized grain transportation by developing covered hoppers that could carry 100 tons of grain. These cars could also be loaded and unloaded quickly.

Prior to that time, grain was handled in boxcars (see "Moving grain in boxcars," adjacent) and early covered hoppers, such as Pullman-Standard's 70-ton three-bay cars.

Pullman-Standard and American Car & Foundry were the leading builders of covered hoppers in the 1960s and '70s. Pullman-Standard's 4,427-, 4,740-, and 4,750-cubic-foot-capacity covered hoppers and ACF's 4,600- and 4,650-cubic-foot-capacity cars were some popular cars from the early covered hopper era (1964-1974). HO scale models based on these prototypes are shown in **figs. 5** through **7** on the next page.

As the demand for covered hoppers grew, other firms began producing cars for grain service. The FMC Corp., Marine Industries, National Steel Car Co., and Trinity Industries are among several former and current car manufacturers that build grain cars.

Since the late 1990s, 5,161-cubic-foot-capacity covered hoppers have become the standard for Class 1 grain-hauling railroads. For example, BNSF Ry. alone has more than 5,000 of these cars on its roster for use in shuttle trains. Athearn's HO scale model, based on the Trinity Industries prototype, is shown in **fig. 8** on the next page.

Newer yet are BNSF Ry.'s 5,188-cubic-foot-capacity covered hoppers. The cars, manufactured by Greenbrier, were delivered to the railroad starting in 2006. Commercial models based on this prototype have yet to be produced.

Though there are dozens of covered hopper models available, not all are for grain service. For example, four-bay cars with individual round loading hatches and piping along the hopper bays are used to transport plastic pellets.

### Moving grain in boxcars



**With the grain door in place, an elevator worker directs the grain chute into a 40-foot boxcar in northwest Iowa. Not long after this circa 1960 photo was taken, covered hoppers became the standard.** Don L. Hofsommer collection

**If you model** the first half of the 20th century, your elevator tracks won't be filled with covered hoppers. Instead, strings of boxcars will be parked here waiting to be filled with grain.

To keep the grain inside the car, wood or paper grain doors (the latter first appeared in 1948) were nailed inside the door opening. This was known as "coopering." About  $\frac{3}{4}$  of the opening was covered.

Prior to loading the car, the sliding door opposite the loading chute was closed. Then an elevator employee would stand outside the car, directing the chute until the car was loaded, as shown above. Since not all grains are alike (wheat and corn, for example, are heavier than oats), the boxcars had load lines marked on the inside so the car wouldn't be filled beyond its load limit.

Though loading boxcars was fairly easy, getting the grain out was difficult and time consuming. When the car arrived at its destination, the doors were pushed in (paper doors were torn open) and the grain would spill out into a receiving pit. Some larger elevators, including one owned by the Great Northern Ry. in Superior, Wis., had car dumpers that tipped the cars sideways and end to end. However, these weren't 100 percent effective. In both cases, elevator employees would have to use shovels or vacuum systems to clean out any grain still in the car.

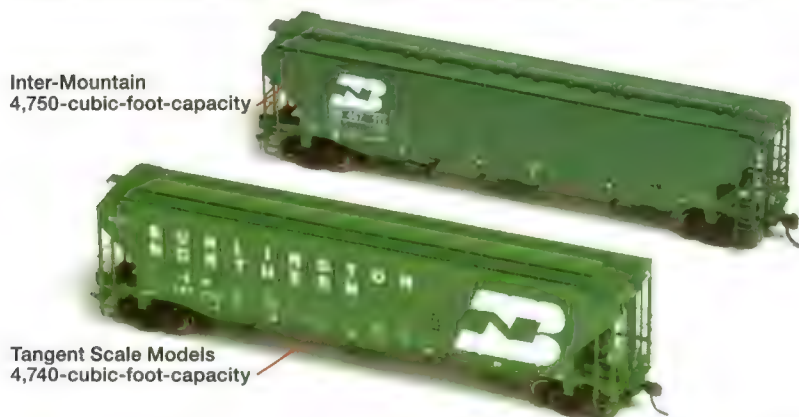
In the 1960s, railroads began using special grain-loading boxcars. These cars had conventional plug doors with hatches near the top for loading and inspecting grain. Though these cars didn't require coopering, they still had the same drawback (difficult to unload) as conventional boxcars.

Boxcars were regularly used in grain service though the 1970s. On the Burlington Northern and Chicago & North Western, boxcars were used even into the 1980s on branch lines where 100-ton covered hoppers were restricted because of poor rail conditions. In Canada, 40-foot boxcars were used on branch lines in the prairie provinces until 1996. — C.G.





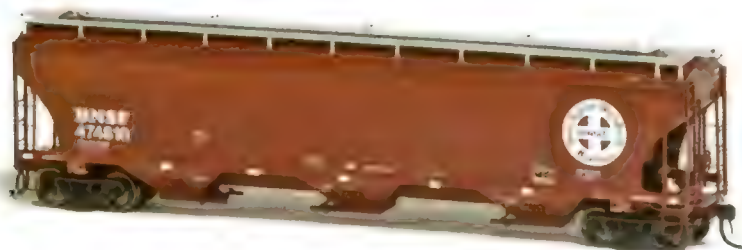
**Fig. 5** The early hoppers. Pullman-Standard's 4,427-cubic-foot-capacity covered hopper was a successful design, with more than 23,000 cars built. This Walthers HO model is based on the 1966 prototype with high sides.



**Fig. 6** A trend-setter. From the late 1960s into the 1970s, Pullman-Standard's 4,740- and 4,750-cubic-foot-capacity covered hoppers were among the most popular grain cars produced. Many are still in service today.



**Fig. 7** A revolutionary design. In 1964, American Car & Foundry unveiled the 4,650-cubic-foot capacity three-bay Center Flow covered hopper. Over the course of the car's production, more than 15,000 were built.



**Fig. 8** The hopper of today. Many of the early covered hoppers have been replaced by 5,161-cubic-foot-capacity and larger cars. This Athearn Genesis HO scale model is based on a prototype manufactured by Trinity Industries.

For more on covered hoppers, read *The Model Railroader's Guide to Freight Cars*, by Jeff Wilson (Kalmbach Publishing Co., 2005).

## Modeling the grain industry

There are more than 25 grain-related structures available in HO and N scales, making it easy to accurately model an elevator scene. **Figures 9** and **10** show two prototype elevators that could be adapted for a model railroad by kitbashing commercial models and using mass-produced structures.

The Co-op County Farmers Elevator in **fig. 9**, located in Danube, Minn., shows an elevator complex that expanded to increase capacity. The corrugated-metal-sided building in the foreground is the original elevator, which included an office, covered unloading area, and a small attached warehouse for feed, fertilizer, and other farm supplies.

The concrete elevator in the background is newer and became the main location for receiving grain. The original elevator was converted to an annex. Grain storage capacity was further increased with the addition of the three white welded steel bins. This style of elevator complex is appropriate for layouts from the 1950s to the present.

Modern elevators, such as Cooperative Plus Inc. in **fig. 10**, have a much different appearance. The one thing that stands out immediately is the absence of an elevator building. Instead, the grain conveyors, which were traditionally located inside the elevator, are now outdoors, as are the pipes, roller-belt conveyors, and walkways.

Though most elevators that load unit trains have a switcher or Trackmobile to move cars, this cooperative uses a tractor to pull cars under the loading chutes. Once the car is spotted, an operator (seated in the enclosed booth) controls how much grain flows through the chute. A second worker directs the loading chute by hand.

Elevators in smaller towns often sell other agriculture-related products, including feed, fertilizer, and farm supplies. Just west of the Cooperative Plus Inc. elevator in **fig. 10**, there is a fertilizer plant, consisting of a warehouse for storing dry fertilizer and two tanks for hold-

**Trains** MAGAZINE

Want to learn more about grain? Read the April 2009 *Trains* magazine, a "100 percent whole grain" special issue.





**Fig. 9 Elevator expansion.** A new concrete elevator and larger bins increased the storage capacity at Co-op County Farmers Elevator in Danube, Minn. The original elevator (foreground) is now used as an annex. Jeff Wilson photo



**Fig. 10 Modern elevator.** The Cooperative Plus Inc. elevator at Whitewater, Wis., is equipped to handle unit trains. The fertilizer plant in the background also receives shipments by rail. Cody Grivno photo

ing anhydrous ammonia (hidden behind the covered hoppers).

In terms of structure kits, you'll need anhydrous ammonia tanks and a building for dry fertilizer storage. These two commodities will generate seasonal traffic (fall and spring) for your model railroad, primarily tank cars loaded with anhydrous ammonia and covered hoppers loaded with dry fertilizer.

Since few elevators are alike, it's a good idea to study prototype photos. One reference that I review often is BNSF

Ry's grain elevator directory. It's available online at [www.bnsf.com/markets/agricultural/elevator](http://www.bnsf.com/markets/agricultural/elevator). In addition to prototype photos, the site also lists each elevator's storage capacity, track capacity, and types of grains handled (the latter information is useful for waybills).

### Putting it all together

If there is one technique you need to learn when modeling the grain industry, it's selective compression. Prototype elevators are towering structures

that, if modeled full-size, would dominate nearly any layout.

Finding a happy medium for train sizes is a must as well. Few model railroads can accommodate full unit grain trains. Instead, pick a size that your layout can support.

Whether you enjoy building a detailed elevator scene, amassing a fleet of covered hoppers, or switching cars at the local cooperative, modeling the grain industry will provide hours of enjoyment. **MR**



Repeated trestles and roof trusses make an impressive-looking crane bay that's surprisingly easy to build from styrene shapes. Jim Forbes photo

45'-0"

27'-0" (center-to-center spacing between trestles)

175'-0"

# Building Freytag's foundry

## Part 2: Craneway and roof supports

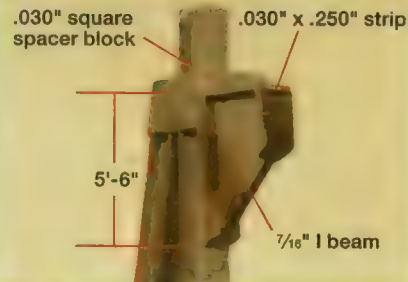
By Dean Freytag • Photos by the author

**T**his month I'll explain how I built the foundry's raw material handling area. While the craneway and its roof supports may look complicated, these large steel structures are made up of repetitive assemblies.

In each case, I took my time to make sure the first assembly was done properly, and then just duplicated it as

many times as needed. Also, once I completed the first sample, I used my Northwest Short Line Chopper to mass produce the additional parts I needed for the rest of the assemblies. The trick to mass-producing parts is to keep like items together and label them with a penciled letter or number that corresponds to the final assembly. **MR**

### Craneway brackets



Each bracket has a styrene block to help position the long crane rail.

**I made 14 brackets** to attach the heavy crane rails to the trestles. Using a miter box, I cut these supports from  $\frac{7}{16}$ " I beam. The long edge is a scale 5'-6" long with a 45-degree angle at the bottom. I added a top mounting plate made of .030" x  $\frac{1}{4}$ " strip, and cemented the brackets in place with their mounting surfaces 45 scale feet above the base. After the joint hardened, I added a .030" square spacer block for the crane rail.

### More on our Web site

A complete list of all the styrene materials and detail parts Dean used to build Freytag's Foundry is available on our Web site at [www.ModelRailroader.com](http://www.ModelRailroader.com).



## Craneway trestles

There are eight 45-foot trestles and three taller ones that support both the craneway and the roof trusses. I used  $\frac{3}{16}$ " H columns for all the verticals and the three crosspieces. All of my angled braces are  $\frac{3}{16}$ " I beams.

The side gussets that hold everything together are scale 36" lengths of .030" x .250" strip. I installed all of the trestle gussets in a vertical position except the top pair that ties the tops of the columns together. After these joints hardened, I sanded the gussets to match the column. I found it worked best to apply the gussets only on one side, add the crosspieces and braces, and then apply the other gussets.

The intermediate crosspieces are a cut-and-fit installation with the lower pair spaced 15 feet apart and the upper ones 13 feet higher.

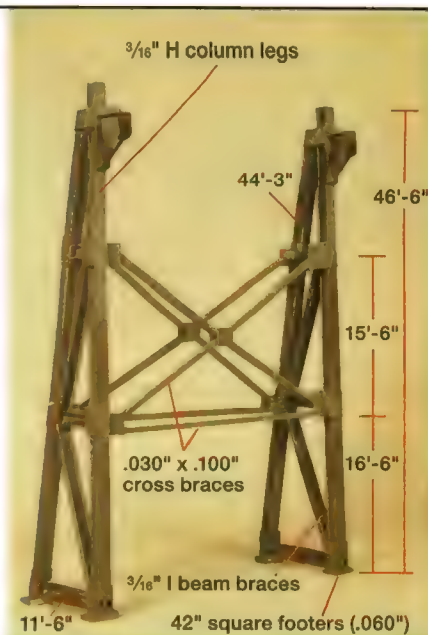
I used sprue cutters to trim the angled braces and create a V-shaped end to fit into the corners. The cutters sometimes raise a small distortion on the flange of the beam, so I removed these with a sanding stick.

Both sides of the crane bay have a pair of cross-braced short trestles that stabilize the linear structure. These trestles are spaced on 27-foot centers, with crossties and angle bracing to prevent side motion when the crane starts or stops.

I used short lengths of  $\frac{1}{8}$ " angle to anchor the cross-bracing on the faces of the gusset plates. I installed the horizontal brace first, then the long angle, and finally the short angles. The gussets are 24" square.

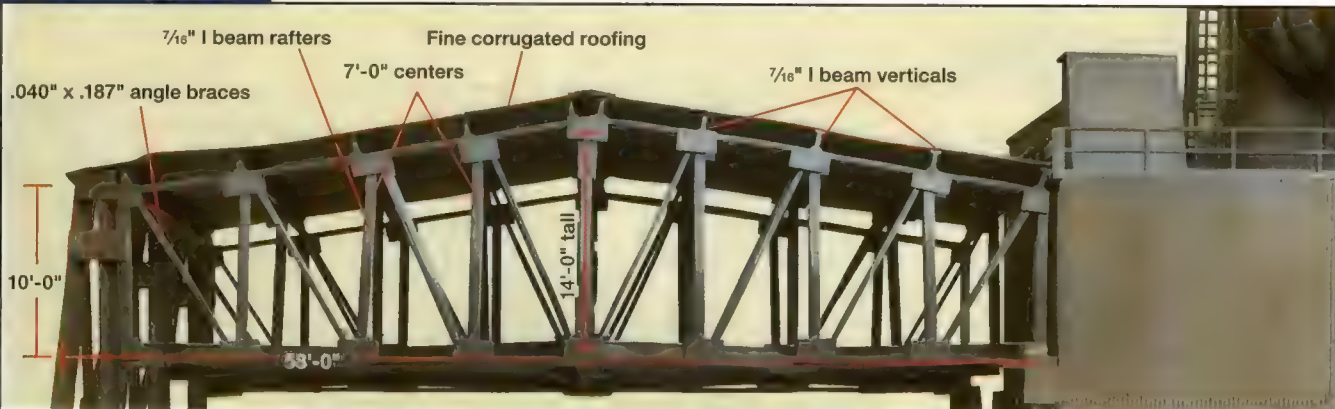
The three taller roof supports are constructed in the same manner except they're a scale 70 feet tall and tied together 3 feet from the top. I also added a third crosspiece positioned 13 feet above the second one with another angle brace.

I followed the same technique to assemble the tall three-trestle version. However, I was careful to make sure the roof supports matched the dimensions of the ironwork attached to the front of the cupola, as this spacing is critical to supporting the roof trusses.



All of the short 45-foot trestles that support the crane are identical, so they can be mass-produced using a Northwest Short Line Chopper to cut all the parts at the same time.

## The canopy roof



All three canopy trusses are identical, so mass production techniques will speed the final assembly. Jim Forbes photo

The three roof trusses are identical. I made them using .040" x .187" strip for the top and bottom members and the angled braces. All of my vertical pieces are  $\frac{3}{16}$ " I beams.

I used my NWSL Chopper to cut the three vertical center beams 14 feet long and six end ones 10 feet long. I also cut 24 gussets .030" x .187" x 3 scale feet long, and eight that are 18" square for each truss. I built the trusses on a sheet of graph paper, making it easier to keep things square.

I assembled each truss starting with the center beam and worked

outward in both directions. Once the outer framework was in place, the intermediate parts were a cut-and-fit proposition. However, I made extra parts for the other two trusses as I fitted each piece in the first one.

Four panels of X bracing, secured by .030" thick gussets attached to the underside of each truss, keep the roof trusses parallel to each other.

I held the three trusses in place with tape while I added the X bracing. I used  $\frac{3}{16}$ " I beams for all of the horizontal bracing, starting with a pair of beams across the middle that keep

the trusses straight. Next, I added the long angled braces from the middle gusset to all four outside corners. Then I fit and cemented the short filler braces and gussets to complete this surprisingly rigid assembly.

I installed another set of X braces to reinforce the middle of the trusses and keep them aligned vertically.

I cut 10 pieces of  $\frac{3}{16}$ " I beam 58 feet long for the horizontal rafters and cemented them to the trusses so the middle pair formed a V under the ridge. Then I trimmed the corrugated roofing to size and cemented it to the rafters.



## Building the crane



A large Plastruct motor,  $\frac{1}{8}$ " styrene rod, and bits of styrene simulate the heavy electrical and mechanical parts which drive the main crane in either direction.

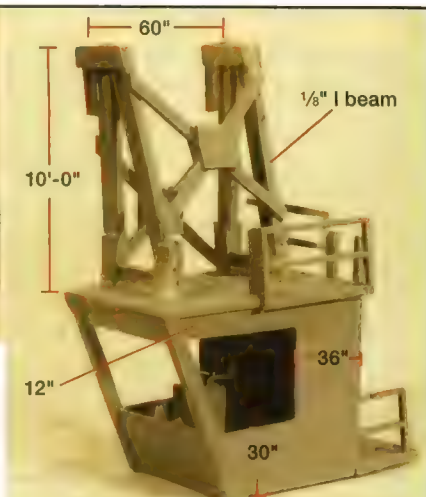
**This industrial crane** is a typical light production machine. It has a wide H-shaped main frame that I fabricated from  $\frac{1}{2}$ " I-beam cut into two 20-foot pieces for the trucks, and two 50-foot long crane beams. I cemented long pieces of  $.040$ " x  $.250$ " strip to the top flanges of the beams, allowing them to extend  $\frac{3}{8}$ " over both ends.

Next, I positioned a beam 4'-6" from the end of a truck and cemented the two together, being careful to keep each joint square. I turned the assembly over and added rectangles of  $.040$ " sheet, a scale 33" wide and 5'-0" long, as reinforcements. Finally, I added a

triangular gusset, made by cutting a 36" square of  $.060$ " sheet in half, to each joint, making sure the crane rails came out square and parallel.

I made the trolley running rails from  $.080$ " x  $.100$ " strip, cemented to the top centers of the beams. Then I cut an 11 x 13-foot trolley deck from  $.060$ " sheet and cemented lengths of  $\frac{3}{16}$ " deep channel along both sides to guide the trolley.

My cab is fabricated from sheet styrene and hung from the main crane, so that it travels with the crane. I made  $\frac{1}{8}$ " I beam hangers with  $.030$ " x  $.060$ " cross braces and  $.020$ " gussets.



The cab is hung from one side of the crane so the operator has a good view of everything that's going on below as he transfers scrap metal.

I spray painted the crane with Floquil TTX Yellow, as the color is a little darker than Reefer Yellow and looks more suitable in the foundry environment. Then I used a no. 2 pencil to burnish the running rails on the craneway and top of the crane.

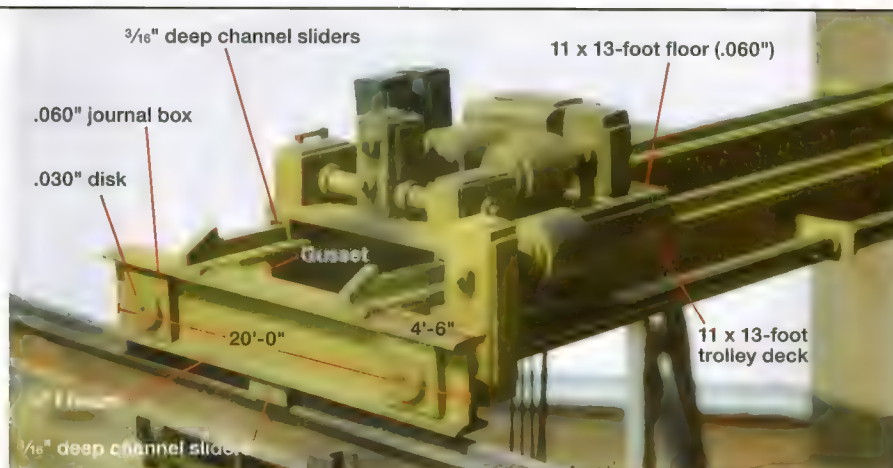
## Installing the craneway

**Each of my crane rails** is made from two pieces of  $\frac{3}{8}$ " I beam that I spliced to get the full scale 175-foot length. I squared the ends, cemented them together, and added a 45-foot splice plate of  $.030$ " x  $\frac{1}{4}$ " strip to the web. When I installed the beam, I made sure these splices were on the back side of the craneway.

My crane rails are  $.080$ " x  $.100$ " strips cemented on the top center of each I beam. I also added short bits of the same strip as end bumpers.

I clamped a steel rule on the rear reference line to align the trestles with the front of the cupola building. Then I cemented the cross-braced double trestle in place, along with the two single trestles at the ends, all spaced on 27-foot centers. I checked my work by sighting along the tops of the trestles. All was well, so I centered the crane rail (end to end) across the trestles and cemented it in place.

I installed the outside craneway in similar fashion, starting with the three tall trestles that had to be aligned with the cupola ironwork. I notched pieces



After the craneway was in place, I finished the crane's trolley with Plastruct motors and some freelanced mechanical details made from bits of styrene.

of  $\frac{1}{4}$ " square strip to use as gauges that fit over the crane rails, which are spaced 50 feet apart.

I positioned the short trestles as before, but this time I temporarily secured them with masking tape until the second crane beam was installed. After checking the beam's alignment, I used my crane rail gauges as guides

while I removed the tape and cemented the remaining trestles in place.

To complete the craneway, I added a small platform to the middle tall trestle, 36 feet above the base. This platform, and its caged safety ladder, provide access to the crane operator's cab and the mechanical systems that require regular maintenance.



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# An N&W branch on a shelf

A famous railroad photographer inspired this compact layout

By Doug Buchanan Jr. • Photos by the author unless noted

**A** 1995 compilation of the photos of O. Winston Link, *The Last Steam Railroad in America*, was the inspiration for my HO scale version of the Norfolk & Western Ry.'s storied Abingdon Branch.

I'd just re-entered model railroad-ing after many years. Having finished a modern, urban layout based on Bob Smaus' HO scale Port of Los Angeles (*Model Railroader*, December 1990), I was ready for a different challenge.

I wanted a layout set in the past, with rural character. With its high peaks, fast creeks, and country setting, the Abingdon Branch seemed to fit.

The Abingdon Branch ran southeast from Abingdon, Va., 55½ miles to West Jefferson, N.C. The line wound through the Appalachians, climbing past quiet mountain hamlets before descending to its terminus. At one point near Whitetop, Va., the line's grade hit an altitude of 3,500 feet – the highest point

east of the Rockies to have regular passenger service.

The line's prosperity was already fading by the time Link first photographed it in June 1955. Service had been reduced to a daily mixed train that took almost four hours to climb up the line, then ambled back in less than 3½. Passenger service vanished in 1963, but freight service held out until 1977, when the N&W abandoned the Abingdon Branch.





1. Southbound mixed train No. 201 glides to a halt next to Green Cove Station on Doug Buchanan Jr.'s HO scale Norfolk & Western layout. The small Virginia town is the focal point of Doug's shelf layout, which is less than 2 feet wide and just 8 feet long.

### Planning the layout

The model railroad had to be small, since my only hobby area at the time was the unfinished basement of our 100-year-old Philadelphia townhouse. I decided on a shelf layout just 8 feet long, with a curved front fascia that gave a maximum depth of 23" in the center and 18" on each end.

The layout sits on top of a small bookshelf, making it easily moveable and giving me storage for rolling stock underneath. The track plan is as simple as it could be: the main line snakes through the scene in a gentle S curve, with a short passing siding to the side of Green Cove station.

A four-foot extension on the right (northern) end of the layout allows for



This O. Winston Link photo of the station at Green Cove, Va., inspired Doug to model the scene. His layout includes a figure of Maud the horse and her cart. This and other classic railroad photos by Link can be viewed at the O. Winston Link Museum in Roanoke, Va., and online at [www.linkmuseum.org](http://www.linkmuseum.org).



2. A cabin car brings up the tail end of the southbound way freight as it passes a hopper awaiting unloading at the O.W. Link Coal siding.

some staging. At times I've also used a staging extension on the left end to allow trains to "run through" the layout completely. At the southern end, the line veers to the left after crossing a trestle over Laurel Creek. This allows me to put the layout in a corner and still use extensions on both ends. There weren't any tunnels on the real Abingdon Branch, but I put one on the right side of my layout to add variety and to mask the layout's edge.

### Benchwork and scenery

I built a simple L-girder framework to support a subroadbed of 1/4" ply-

wood. From right to left, the roadbed climbs 1 1/4". This mimics the grade of the real branch as it climbed from Abingdon to Whitetop.

For my terrain, I wove a web of cardboard strips and secured them with a hot glue gun. I laid plaster gauze over the webbing, then painted it with acrylic craft paints. I'm a fan of acrylic craft paints like those made by DecoArt and Delta Technical Coatings. The paints are inexpensive, mix together easily, and wash off with water.

I used several tried-and-true techniques for ground cover, most of which can be found in Lou Sassi's book *Basic*





## Modeling Laurel Creek



3. The 304 drifts downgrade across Laurel Creek with a stockcar in tow. Doug scratchbuilt the trestle and used gloss medium for the water.

For the water in Laurel Creek and elsewhere on the layout, I find gloss medium works best. I used Mod Podge Gloss-Lustre, made by Plaid. This material is inexpensive, has no offensive odor, and is available at most craft stores. Similar in texture to white glue, it produces a glossy approximation of water. It's also easily brushed onto small stones and deadfall to represent wet or damp surfaces.

I scratchbuilt the wooden trestle over the creek. I looked over several photos of Abingdon Branch trestles in Link's *The Last Steam Railroad in America* and used HO scale ties as components. I finished the trestle with commercial HO scale bolt heads and weathering powders.

I used Microsoft Publisher, white cardstock, and a sharp hobby knife to duplicate the N&W's standard warning signs at either end of the trestle. The warning reads: "DO NOT WALK NOR TRESPASS ON THE BRIDGE." —D.B.

This overall view shows the entirety of Doug's Abingdon Branch layout. Extension tracks can be attached to either end of the main line to allow through operations.

*Scenery for Model Railroads* (Kalmbach Books). I thought one of Lou's most effective techniques was to "tease" green poly fiber apart and then sprinkle it with ground foam, using bargain-priced hairspray to lock everything in place. This gives a very good approximation of low-lying shrubs and undergrowth, and I used the technique extensively on my layout.

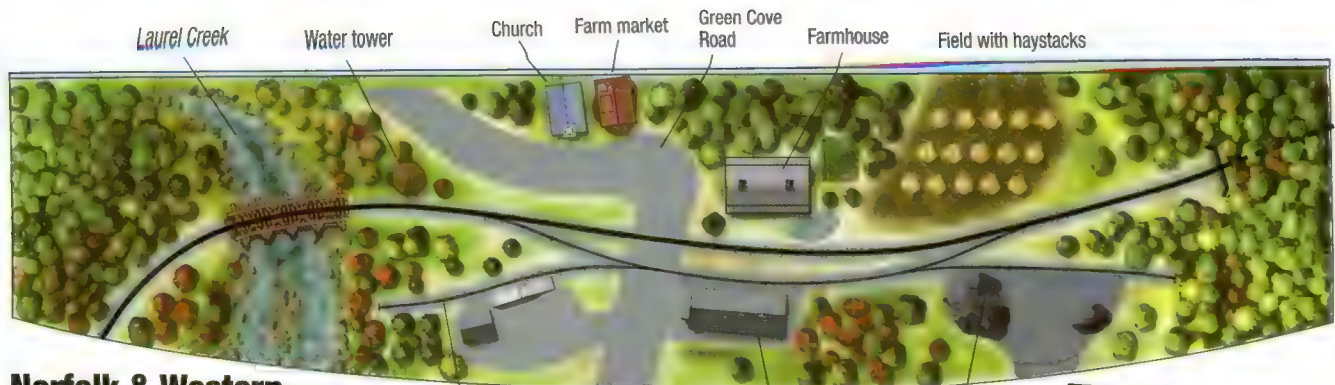
I also made my own all-natural forest floor covering from the real thing — dead leaves. I ground the leaves up in a blender and then dried them in an oven.

My trees are a combination of home-made trees, kits from SuperTrees and Forests-in-a-Flash, and finished trees from Sterling Models.

## Backgrounds and buildings

I have little artistic talent, but I'm proud of my hand-painted backdrop. I took a copy of O. Winston Link's book to a local paint supplier and had them match the blue shade of Virginia's fall sky as best they could. I started with a coat of sky blue on a 1/4" Masonite sheet, then overlaid rows of weathered mountains, darkening my paint with each successive layer to add depth. Once the layers of mountains were complete, I used a stippling technique to dab on fall foliage.





## Norfolk & Western, Abingdon Branch

HO scale (1:87.1)

Room size: 1'-11" x 8'-0"

Scale of plan: 1/8" = 1'-0", 12" grid

Numbered arrows indicate photo locations

Illustration by Jay Smith

### ►► The layout at a glance

**Name:** Abingdon Branch

**Scale:** HO

**Size:** 2 x 8 feet

**Prototype:** Norfolk & Western Ry.

**Locale:** Western Virginia

**Era:** 1950s to early '60s

**Style:** shelf

**Mainline run:** 8 feet

**Minimum radius:** 24"

**Minimum turnout:** no. 6 (no. 3 wye)

**Maximum grade:** 1.5 percent

**Benchwork:** L-girder

**Height:** 36"

**Roadbed:** cork on 1/4" plywood

**Track:** Atlas

**Scenery:** plaster gauze

**Backdrop:** painted 1/4" Masonite

**Control:** Digitrax DCC



4. Engine No. 304 spots a boxcar at Green Cove's team track. The locomotive is a repainted Bachmann Spectrum 2-8-0 equipped with a SoundTraxx Digital Command Control sound decoder in the tender.

My structures are all laser-cut wood kits. To me, these kits are one of the more significant developments in the hobby in recent years. They're reasonably priced, straightforward to build, easy to weather with powdered pastels, and look good. My water tower, church, country market, and two-story farmhouse are all from American Model Builders. My layout's signature structure – the Green Cove station – is by KingMill Enterprises.

The arrangement of the structures around the station, and my addition of the country market, church, and nearby team track office, are all freelanced. In the real Green Cove, the station and the former stationmaster's house (today's Buchanan Inn) are isolated and sit on the same side of the former railroad right-of-way.

### Operations

Operation on my version of the Abingdon Branch is simple. Two small

industries – a team track and a coal dealer – give me an opportunity to do a little switching as trains 201 (the southbound mixed) and 202 (northbound) pass through Green Cove each day. Trains may leave or pick up a boxcar or stockcar on the team track, or leave a loaded hopper at O.W. Link Coal. For operational interest, I added two way freights to my timetable, one northbound (No. 203) and one southbound (No. 204). I use waybills and car cards to control car movements.

I run my layout with a Digitrax DCC system. Like the rest of my layout, the wiring is simple. Two leads connect my command station to the tracks, and two more connect to the programming track under the layout.

My version of the Abingdon Branch has given me many hours of enjoyment. I'm sure having a 1,000-square-foot layout is lots of fun, but you can make do with far less and enjoy the hobby just as much. **MR**



### ►► Meet the author

Doug, seen at right on the steps of the Green Cove, Va., station, and his father Doug Sr., left, have enjoyed trains together for more than 20 years. Doug Jr. lives with his wife, Heather, and daughter, May Margaret, in Wynnewood, Pa.



# 6 tips for choosing the right decoder



With a wired decoder, you must make sure that it meets your locomotive's requirements (more about this in the following tips) and that there's room for it under the shell. Many of today's wired decoders are so small that they'll fit in all but the smallest of N scale locomotives.

## 3 Motor ratings.

If you choose a drop-in decoder, this isn't a problem. However, if you're picking out your own wired decoder, you need to know how much current your locomotive draws. Most decoders are rated for at least 1 amp. If your locomotive is HO scale or smaller and has a can motor, chances are it draws much less than 1 amp.

In large scale locomotives (and engines with open-frame motors) it's best to measure the current with an ammeter. Run your locomotive on DC power with an ammeter connected in series with the track and measure the current. Gently press down on the locomotive until it stalls and measure its stall current. Many decoders have both a continuous and stall current rating. Make sure the decoder's ratings are greater than what you've measured.

## 4 Lighting functions.

Headlights, beacons, Mars lights, firebox flicker, and ditch lights make our miniature locomotives come alive, and DCC decoders make all of these features possible. Be sure the decoder you choose has enough function outputs to control all the lighting effects you want.

Out of the box, these outputs are either on or off, but you can program them to flash or flicker. Not all lighting effects are available on the function outputs, so look for a feature called "function mapping." This allows you to change which button controls a specific function output.

Also, make sure the function output supplies enough current to run all the lights you want. Most are rated on per-function output,

With dozens of Digital Command Control (DCC) decoders to pick from, choosing the right one might be a bit intimidating. Here are six tips to make your selection easier.

**1 Sound or no sound.** Sound is a personal preference. Many people have sound in every locomotive, others can't stand the distraction. About half of my locomotives are sound equipped, and I try to have at least one on every train.

If you decide to have sound in your locomotives, you need to find room for a speaker. In N scale, this can be challenging. In HO and other scales, the fuel tank, locomotive cab, and below the radiator fans are good locations for diesels. Tenders are a good decoder location for steam locomotives.

Also consider if you want the ability to change the sounds or create your own effects. Digitrax, ESU, and QSI make decoders that allow you to upgrade your sound files after the decoder is installed.

Downloading from a Web site isn't always necessary, however. If the sound you want is factory installed in the decoder, there's no

Choosing the right Digital Command Control decoder for your locomotive can be confusing. Mike Polsgrove shares tips for making the selection easier. Jim Forbes photo

need to change it. Some high-quality sound decoders, such as SoundTraxx's Tsunami, don't allow you to change sounds.

If you initially choose not to have sound and later change your mind, don't worry. There are sound-only decoders from Digitrax, SoundTraxx, and others that you can install without having to change your motor decoder.

**2 Drop-in (plug-and-play) or wired.** There are dozens of decoders, with and without sound, that are designed to fit a specific locomotive. These are good choices for the type of locomotive they are made for, as installation is easy. Some of these decoders don't even require soldering.

However, there may be features you desire that aren't available in a drop-in decoder for your locomotive, or there may not be a drop-in available. In those cases, a wired decoder is the best solution.



but some give a rating for all outputs. This varies between manufacturers, so pay special attention to it. As a guide, bulbs can draw anywhere from 10mA to 100mA. Light-emitting diodes can draw from 10mA to 50mA.

**5 Motor control.** If slow-speed operation is important to you, consider a decoder with back-electro-motive-force (back-EMF) control. Back-EMF measures the voltage produced by a rotating motor. This is used to determine the motor's speed and increase or decrease its voltage to keep it running at a constant speed.

Other types of motor control include "dither," found in addition to back-EMF control on Train Control Systems decoders, and "torque compensation," used on NCE decoders. This provides a higher voltage kick at a programmable voltage and period (kick rate) to help get the motor started.

Most decoders have programmable Vstart, Vmid, and Vhigh Configuration Variables (CVs) to help in speed matching different locomotives, but the optional programmable speed table (or curve) offers even finer speed control.

**6 Warranty.** Virtually all DCC manufacturers offer a warranty on their decoders, which varies from 90 days to 10 years. Some even offer a "no-fault" warranty under which they'll replace a decoder free of charge or for a nominal fee even if you wire it incorrectly. This is especially useful if you're installing a decoder for the first time.

**The next time** you go to the hobby shop to purchase a decoder, keep these six tips in mind. If you're unsure of a decoder's features, ask the store clerk, read the label on the package, or check the manufacturer's Web site. This will help you purchase your decoder with confidence. **MR**

Send your questions about Digital Command Control to DCC Corner, *Model Railroader* magazine, P.O. Box 1612, Waukesha, WI 53187, or e-mail [dcc@mrmag.com](mailto:dcc@mrmag.com). We regret we can't answer all the questions we receive.

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# Product Reviews



## Brass Southern Pacific Mogul in HO scale features DCC, sound, and a lot of detail

**Accounting for a total of 72** locomotives, class M-6 Moguls were among the most numerous 2-6-0s on the Southern Pacific. The brass HO scale M-6 from Sunset Models has a high level of detail and is available with a dual-mode QSI Quantum sound decoder for sound effects on DC or DCC layouts.

**Prototype.** Most of the class M-6 2-6-0 Moguls began their careers as class EF Vauclain compound 2-6-0s delivered by Baldwin between 1901 and 1903. By the mid teens the

railroad converted all the locomotives to single-expansion cylinders and reclassified them M-6. Many also had their boilers replaced.

For most of their careers, the M-6 Moguls hauled light freight trains or switched yards. Most of the SP 2-6-0s served into the 1950s, including class M-6 no. 1727, which is on display in Dunsmuir, Calif.

I couldn't find any published prototype drawings of an M-6. However, the model's wheel spacing and driver diameter match Southern Pacific equipment diagrams from the Kalmbach Publishing Co. Library files. Dome placement, piping, and other details matched prototype photos of SP class M-6 no. 1727.

Sunset also sells an M-9 Mogul, which uses the same boiler, tender, and running gear as the M-6 but has some detail differences.

**Details and paint.** The Sunset model is built primarily of brass. All external piping, sand lines, injectors, air pump, and other boiler-mounted appliances are separately applied metal parts. A

cord runs from the bell ringer to the cab.

The locomotive cab interior features a detailed backhead with painted valve handles and water sight glass. The roof vent opens and closes. The folding cab apron has etched diamond tread. There is clear glazing in the front and rear cab windows.

The M-6 has a removable scale-size dummy coupler on the pilot. Although not included, an operating coupler could be installed. Some filing may be necessary to widen the coupler pocket.

The 100-C-4 Vanderbilt tender is also well detailed, with separately applied handrails and simulated wood grain on the tender deck. All the tender water hatches open.

The lettering on the locomotive and tender is opaque and straight. The Harriman classification data under the cab number is readable

### ▶▶ Reviewed in this issue

**76** Proto 2000 from Walther's sound-equipped HO E7

**78** SoundTraxx DCC sound decoder

**80** Large scale two-bay hopper HO scale warehouse kit

**82** Trainworx N scale gondola traction-line maker

### More on our Web site

Current subscribers can see a video of the M-6 Mogul running along our HO scale club layout. Visit our Web site at [www.ModelRailroader.com](http://www.ModelRailroader.com).





under magnification. The SP lettered its locomotive tenders with "Southern Pacific Lines" from 1913 to 1946. The tender is lettered for a water capacity of 10,060 gallons.

**Mechanism and electronics.** The model has a die-cast metal frame with the brass boiler and cab mounted on top. A five-pole skew-wound motor inside the boiler is connected to a gearbox driving the second driver axle. The metal side rods turn the other drivers.

All the drivers are sprung to keep them in electrical contact over uneven rails. However, the pilot is only eight HO scale inches above the railhead. Though this is a prototypical distance, if the brass pilot touches both rails, a short circuit will occur. You may wish to file the bottom of the pilot to increase the clearance or glue styrene under the pilot to prevent shorts on uneven track.

The Mogul doesn't have traction tires but has a drawbar pull equivalent to 35 HO freight cars on straight and level track. However, the locomotive stalled when hauling a train half that size up a 1.5 percent grade. If you run the M-6 on hilly routes, you may want to try Bullfrog Snot traction-tire maker (reviewed on page 82).

A six-wire cable connects the QSI Quantum sound decoder and downward-facing speaker in the tender to a plug under the rear of the locomotive cab.

**Sounds and lights.** At rest the model's QSI Quantum sound decoder has random automatic sound effects including the air pumps, dynamo, and injector.

Using a DC power pack, you can trigger sounds such as the whistle and bell, and program features such as the volume level and momentum. A QSI Quantum Engineer (sold separately) makes it easier to operate and program the model on a DC layout.

In forward the Mogul's headlight shines, and in reverse the headlight dims and the backup light shines. The sound of four chuffs per wheel revolution is synchronized to the motion of the drivers. As the locomotive starts moving in DC mode there's also the separate hiss of the open cylinder cocks until the locomotive exceeds 12 scale mph.

In DCC the model supports 13 functions, including function 7, which turns the open cylinder cock sound on or off. Other functions include the whistle, bell, and coupler crash. Function 9 lets you increase the intensity of the chuffs when you advance the throttle, while keeping the locomotive's speed constant. This is useful for simulating the locomotive working extra hard climbing a grade.

The QSI Quantum sound decoder features many programmable configuration variables (CVs), including setting the locomotive's long address and adjusting the volume levels of individual sounds. An extensive DCC user's manual that includes a complete list of CVs is available on the Web at [www.qsisolutions.com](http://www.qsisolutions.com).

**Speed tests.** The Sunset Mogul requires a lot of voltage to get started in DC. I tested the M-6 with an MRC Tech 4 power pack. Once I advanced the throttle to 9 volts, the model started moving at 1.8 scale mph and reached a top speed of 35 scale mph at 12 volts.

## ▶▶ HO scale SP 2-6-0

**Price:** \$699.95 (DCC), \$649.95 (DC)

### Manufacturer

Sunset Models Inc.  
37 Fourth St.  
Campbell, CA 95008  
[www.3rdrail.com](http://www.3rdrail.com)

**Versions:** (all Southern Pacific, three road numbers each)  
M-6 lettered Southern Pacific Lines, M-9 lettered in post-1946 livery

### Features

9-pin DCC plug (DC version)  
Dual-mode Digital Command Control (DCC) sound decoder (DCC version only)  
Electrical pickup on all drivers and tender wheels  
Five-pole skew wound motor  
Minimum radius: 18"  
Operating magnetic knuckle coupler on rear of tender at correct height (Scale-size dummy coupler on pilot)  
Metal RP-25 contour wheels in gauge  
Weight: 11 ounces (engine), 16 ounces (engine and tender)

### Sunset HO M-6 Mogul

<b>Drawbar pull</b>		2.6 ounces	
		35 HO scale freight cars	
Scale speed (DC)		Scale speed (DCC)	
Volts	Scale mph	Speed step	Scale mph
9 (Start)	1.8	1	2.2
10	12	7	10.3
11	29	14	25.0
12	35	28	55.0
<b>Current draw at 12 volts (DC)</b>		Slipping	.30A
		Stalled	.58A

I tested the model in DCC using an MRC Prodigy Advance that delivers 16.4 volts to the track. In speed step 1 the model crept along at 2.2 scale mph and accelerated to a top speed of 55 scale mph in speed step 28. You can set the QSI decoder to 128 speed steps for finer control, especially at lower speeds.

With realistic sounds and loads of detail, the Sunset HO M-6 would look great working an Espee branchline layout. — Dana Kawala, *associate editor*





# Dual-mode sound highlights HO scale E7A diesel by Proto 2000 from Walthers

**Available in a version** with a dual-mode Digital Command Control (DCC) sound decoder, the upgraded Proto 2000 from Walther's HO scale E7 sounds as good as it looks. The model is a worthy depiction of its streamlined prototype, which led signature passenger trains, including the Milwaukee Road's *Twin Cities Hiawatha*, across the country.

**Prototype.** General Motors' Electro-Motive Division introduced the E7 in 1945, and it became EMD's all-time top-selling passenger locomotive. A total of 428 A units and B units were built for 30 North American railroads.

In the years following World War II the Milwaukee Road completely replaced steam power in *Hiawatha* service with five sets of E7As, as well as Fairbanks-Morse C-Liners and EMD FP7 diesels.

On the Milwaukee Road and other railroads around the country, 2,000-hp E7 diesel-electrics led passenger trains through the 1960s. Some E7s were still in service when Amtrak was formed in 1971.

**The model.** The Walther's HO scale model uses new, upgraded tooling compared to the Life-Like Proto 2000 model that we reviewed in the March 1997 *Model Railroader*. The E7 matches prototype dimensions in *The Model Railroader Cyclopedia Vol. 2, Diesel Locomotives* (Kalmbach Publishing Co., out of print). The highly detailed plastic body shell matches prototype photos of Milwaukee Road nos. 18A and 18B.

Separately applied parts include hand grabs, windshield wipers, and see-through grills. Prototype-specific details on the Milwaukee Road model include the large angled number boxes that were added by 1950. As on the prototype, the original small number boxes are intact but painted over.

Paint coverage on our sample is smooth and evenly applied. All lettering is straight and matches prototype photos. There are printed EMD builder's plates on the bottom sill under the cab.

A five-pole skew-wound motor with brass flywheels is in the center of the die-cast metal frame. The motor drives the truck gearboxes through universal joints. With a drawbar pull of four ounces each, a pair of Walther's E7A units has no trouble hauling a full 10-car *Twin Cities Hiawatha* consist.

The DCC decoder is mounted on top of the frame. Two downward-facing speakers are located at the front and rear.

**Sound and programming.** The QSI Quantum sound decoder has sound and lighting effects in both DC and DCC operation. When moving forward the top Mars signal light operates, while the bottom headlight illumination is constant. The dual-speaker sound system delivers an impressive array of effects, including the distinctive rumble of the prototype's 567A engines.

Factory set at maximum volume, the sound system caused the body shell to vibrate. The noticeable buzz

didn't diminish until the volume was lowered by half. I eliminated the buzzing by placing strips of electrical tape along the sides of the model's frame.

You can trigger sound effects using a DC power pack, although a QSI Quantum Engineer (sold separately) makes it easier to operate and program the sound-equipped E7 on DC layouts.

Programming in DC mode includes adjusting the volume and adding momentum for more realistic starts and stops.

In DCC, the E7 supports 13 functions, including the horn, bell, and coupler crash. You can program individual lighting and sound effects. An extensive DCC instruction manual for the QSI Quantum decoder, including a list of all the programmable configuration variables (CV's), as well as a separate advanced DC user's manual is available on the Web at [www.qsisolutions.com](http://www.qsisolutions.com).

I wasn't able to advance consist our two samples using the consist menus of my NCE Power Cab or the MRC Prodigy Advance DCC system in our workshop. Instead, I had to adjust individual CVs in each locomotive. I programmed CV19 to the consist address. (For the trailing unit running in reverse, CV19 equals the consist address plus 128). You'll also need to program CV's 21 and 22 for each locomotive depending upon which functions you want controlled by the consist address versus the individual locomotive addresses.





### Walthers HO E7A diesel

<b>Drawbar pull</b>		4.0 ounces	
		28 HO passenger cars	
<b>Scale speed (DC)</b>		<b>Scale speed (DCC)</b>	
Volts	Scale mph	Speed step	Scale mph
8.5 (start)	1.1	1	2.0
10	14.0	7	12.5
11	31.5	14	32.0
12	70.0	28	70.0
<b>Current draw at 12 volts (DC)</b>		Slipping	.35A
		Stalled	.85A

**Speed tests.** The DCC-equipped E7 comes factory programmed with Regulated Throttle Control, which simulates the momentum of a prototype diesel. For more immediate response during our tests, I programmed the locomotive to Standard Throttle Control following the procedure in the instruction manual.

In DC, the model's sounds and lights came on at 4 volts, but the E7 required a lot more voltage to get going. At 8.5 volts the model started moving smoothly at 1 scale mph. At 12 volts the E7 reached a top speed of 70 scale mph. This speed is a bit lower than that of the prototype, which could be geared for 85, 92, 98, or 117 mph.

I ran the model in DCC using an NCE Power Cab that delivers 13.5 volts to the track. The model started at 1 scale mph in speed step 1 and accelerated to a top speed of 70 mph. The QSI decoder supports 14, 28, or 128 speed steps.

Prototype-specific detail and accurate sounds make the Walthers E7 a standout HO scale diesel. Our pair of Milwaukee Road E7A locomotives looked and sounded great as they led the HO scale *Twin Cities Hiawatha* around our Milwaukee, Racine & Troy layout. — D.K.

### HO scale E7 diesel

**Price:** DCC-sound-equipped: \$249.98 to \$259.98 (single A or B unit), \$479.98 to \$499.98 (A-A or A-B set). DC only: \$159.98 to \$179.98 (single A or B unit), \$329.98 to \$349.98 (A-A or A-B set)

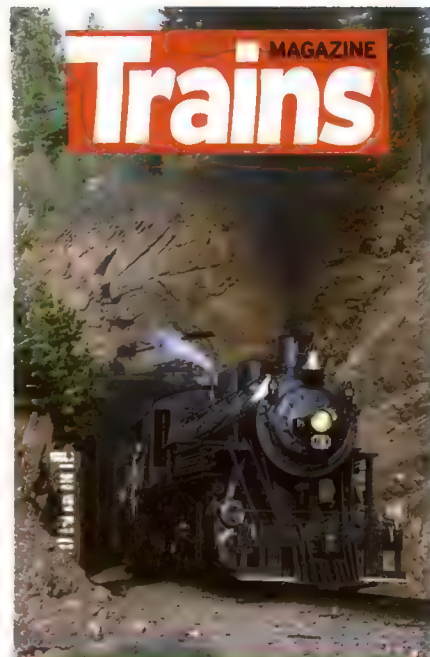
#### Manufacturer

Wm. K. Walthers Inc.  
P.O. Box 3039  
Milwaukee, WI 53201  
www.walthers.com

**Road names:** (A-A sets or single A units) Milwaukee Road orange/red/black or yellow/gray; Baltimore & Ohio; Chicago & North Western; Great Northern; Gulf, Mobile & Ohio; Seaboard Air Line. (A-B sets or single A or B units) New York Central; Pennsylvania; Southern Pacific; and Union Pacific. Undecorated versions also available

#### Features

All-wheel drive and electrical pickup  
Die-cast metal Proto-Max operating knuckle couplers (at correct height)  
Dual-mode DCC sound decoder with dual speakers (DCC version only)  
Five-pole skew-wound motor with dual brass flywheels  
Illuminated number boxes  
Metal RP-25 contour wheels in gauge  
Minimum radius: 18"  
User-installed retractable-coupler pilots and crew figures  
Weight: 19 ounces (A unit)



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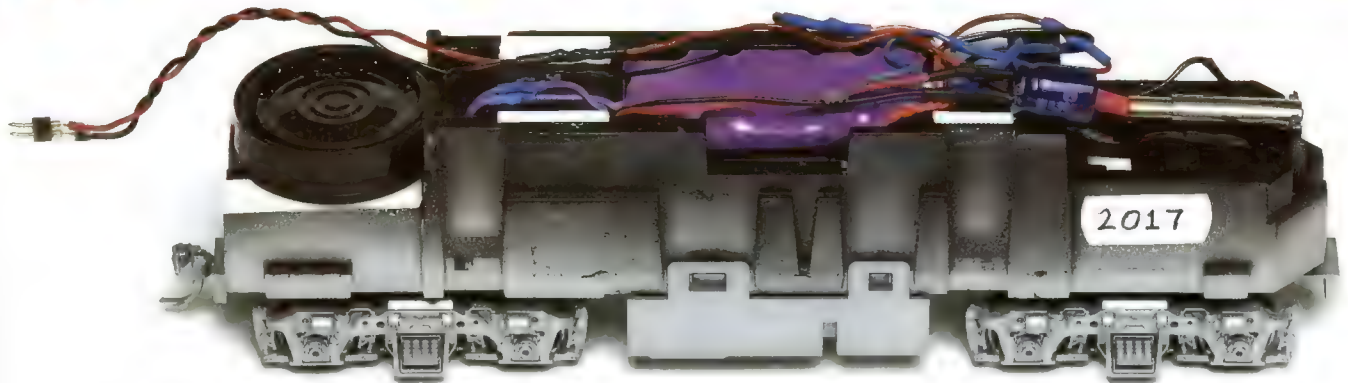
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## DCC diesel sound decoder features multiple programming options

"That sounds good!" was the enthusiastic response of my *Model Railroader* colleagues when I was programming and testing the SoundTraxx Tsunami diesel sound decoder in the MR workshop. I certainly agree. What's more, the

TSU-1000 Digital Command Control decoder, no. 827101 with the sounds of Electro-Motive's 567 diesel engine, strongly reminds me of the first-generation locomotives that were so common when I was growing up around trains.

Installing the decoder was straightforward, as its color-coded wiring harness conforms to National Model Railroad Association Recommended Practice 9.1.1. Its size, .25" x .68" x 1.68", allowed it to sit right down on top of the motor in a Stewart HO scale F3 after I'd removed the model's original printed-circuit board. I cut away part of the locomotive's chassis to allow a 1"-diameter speaker in a shallow enclosure to ride above the rear truck facing up inside the body.

The speaker I used is SoundTraxx no. 810054 with a no. 810010 circular enclosure or "baffle" – neither is included. Many other 8-ohm speakers and enclosures will perform as well. The largest speaker and enclosure combination that you can fit in a given model is usually the best choice in terms of sound reproduction.

**Programming.** Those who have used the earlier steam Tsunami decoders know that these are sophisticated controllers and sound generators with many features and even more programming options. The diesel Tsunami sounded good as soon as I powered up the track under my F3, but I had to put in a few hours of study and testing to learn what this decoder can do.

The decoder is packaged with a sheet listing its specifications and giving basic instructions for installation and operation. To take full advantage of its features, however, you'll want to download the Tsunami user manuals from the SoundTraxx Web site. If you want to print them and place them in a binder as I did, make sure the paper tray is full before you start!

The 17-page "Quick Start Guide" and 33-page "Installation Guide" are especially helpful for those getting started in DCC, but the most detailed programming instructions are in the 65-page "Diesel Sound User's Guide." The 105-page "Technical Reference" spells out the meaning of every bit in every Tsunami Configuration Variable (CV). I did print it out but found most of what I wanted to know in the "User's Guide."

**Capabilities.** When configured the way I wanted it, the decoder made a locomotive that was already a good runner oily smooth at low speeds. With sufficient acceleration momentum and an exponential speed curve, you can hear the diesel engine revving up realistically before the unit begins to move. I also programmed a fair amount of deceleration delay for long gliding stops, but set the F11 brake squeal function to stop the locomotive more quickly for precise spotting.

This is indeed a combined sound and control effect, an electronic brake that's one of my favorite features of the Tsunami. It works by subtracting a number entered in

### ▶ DCC diesel sound decoder

**Price:** \$119.95

#### **Manufacturer**

SoundTraxx

210 Rock Point Drive

Durango, CO 81301

[www.soundtraxx.com](http://www.soundtraxx.com)

#### **Features**

16-bit digital sound system

14 diesel locomotive sound effects including a selection of programmable horns

Multiple lighting effects  
14 functions

Advanced motor control including back-electromotive force (BEMF) load compensation

Available with digital sound recordings for three Electro-Motive Division, three Alco, General Electric FDL-16, and Fairbanks-Morse H-12 diesel engines

1A capacity (steady-state current in Stewart F3 .11A; stall current .4A)

Supports programming track and operations mode programming

Supports DC ("analog mode") operation with limited control of sound effects



CV61 from the deceleration or braking rate set in CV4. The unit can coast smoothly for a long distance when the throttle is turned down or off, but you can still make controlled stops using a function button as a brake.

For DCC cabs with 10 or fewer functions, the User's Guide gives detailed instructions for re-mapping F11 to another function control. I put it on F9.

**Other features.** The decoder's selection of 16 prototypical air horn sounds included the Leslie A200 that's correct for my as-built Santa Fe passenger F3. With the light configuration CVs I set the headlight for realistic non-directional, on-off-with-dimmer operation. If I'd needed them, functions are included for backup lights, simulating rotating signal lights, and blinking various types of flashers and beacons. Programming options accommodate bulbs or LEDs without requiring additional resistors.

For descending grades F4 engages the sound of a dynamic brake fan, and I programmed the decoder to realistically reduce the speed of the diesel engine when dynamics are used, independent of the locomotive's speed. Mixer controls independently adjust the volume of every sound function, and there's a CV for overall volume too. Equalization and reverb adjustments help maximize the performance of the speaker.

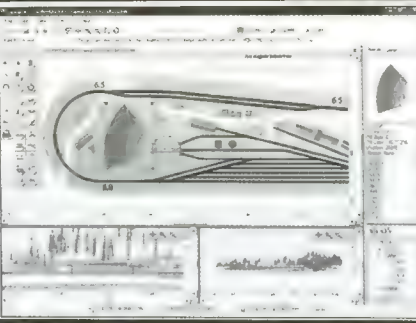
If you find the sound of idling units annoying while focused on something else, you can engage the decoder's Quiet Mode. This automatically shuts off the audio after a time set by CV113, but the sounds restart whenever the decoder receives a non-zero speed command or a function command other than "mute" (F8).

**The sounds you want.** Our response to sound effects is necessarily subjective, and that argues for sound decoders that each of us can customize for our own enjoyment. With its many programming options and operational flexibility, the Tsunami diesel sound decoder has the potential to make your model diesels sound exactly the way you want. — *Andy Sperandio, executive editor*

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### ▶▶ Aristo-Craft 1:29-proportion two-bay offset side hopper



**Price:** \$80

**Manufacturer**

Aristo-Craft Trains  
698 South 21st St.  
Irvington, NJ 07111  
aristocraft.com

**Road names:** Great Northern (pictured) and 16 other road names. Data-only version also available (painted red or black).

**Comments:** A ready-to-run model of a two-bay offset-side hopper is

the latest 1:29-proportion freight car from Aristo-Craft.

Our sample, painted for the Great Northern Ry., closely resembles photos of 50-ton coal hoppers pictured in Ed Kaminski's *American Car & Foundry Co.: A Centennial History, 1988-1999*. Its dimensions match those listed for GN car no. 73448 in the *Official Railway Equipment Register*. The paint is smooth and even, and the

printing is crisp and legible. The sprung hopper doors open.

The sprung trucks have metal axles and plastic wheels, which were in gauge. The car comes with knuckle couplers, but hook-and-loop couplers are included.

These Aristo-Craft hoppers make it possible for the large scale modeler to build a serious coal-hauling fleet. — Steven Otte, associate editor

### ▶▶ Atlas H0 scale Middlesex Manufacturing Co.

**Price:** \$39.95

**Manufacturer**

Atlas Model Railroad Co.  
378 Florence Ave.  
Hillside, NJ 07205  
www.atlasrr.com

**Comments:** This new warehouse kit (no. 0721) is the latest addition to the Atlas Master Line of buildings. The kit has a footprint of 5½" x 15" and features separately applied windows, eight chimneys, a loading dock, and window blanks. A 1⅜" x 1⅞" x 7⅞" elevator machine room is located at one end of the building.

The parts are crisply molded and have little flash. The dentils are especially well done. Some minor filing and sanding is necessary to clean up the rough spots where the parts are attached to the sprues.

Overall, the kit is easy to assemble. However, take your time when cementing the long corner joints. I had a few corners that



didn't align properly, and in the process of fixing them, damaged some of the brick detail.

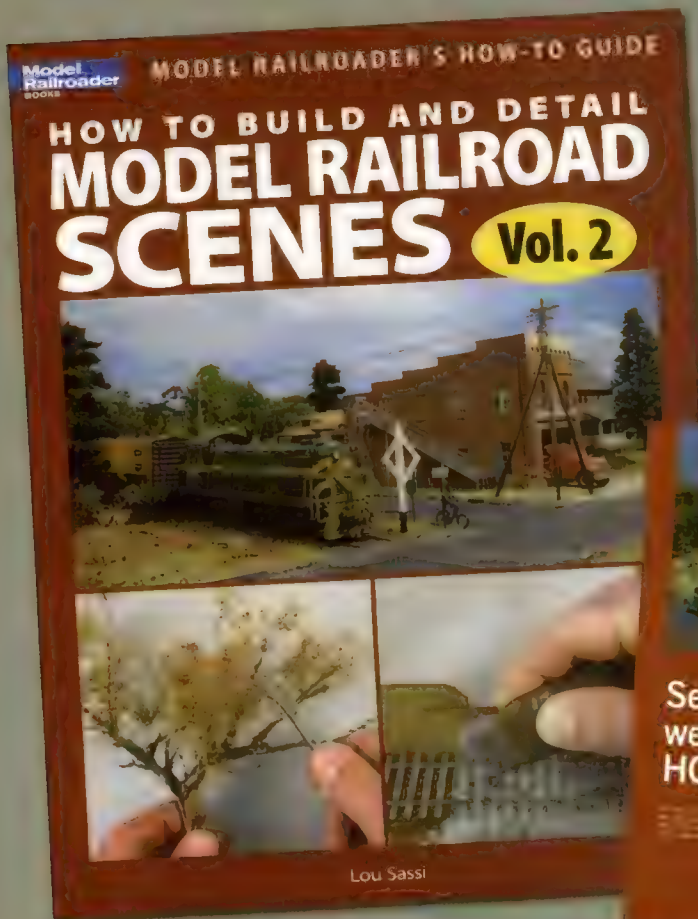
If you plan on handling the model frequently, I'd recommend adding interior bracing to give the structure extra strength. I cemented lengths

of .188" x .250" styrene strip above the windows and doors on the first, second, and third floors.

Atlas has captured the look of a typical American manufacturing plant from the late 19th century. — Cody Grivno, associate editor



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## Product Reviews

### ▶▶ Trainworx N scale 46-foot drop-bottom gondola



**Price:** \$24.95

**Manufacturer**

Trainworx

P.O. Box 127

Delta, CO 81416

[www.train-worx.com](http://www.train-worx.com)

**Road names:** Northern Pacific and seven other road names (12 road numbers each). Data-only and undecorated versions available.

**Comments:** Though our sample is lettered for the Northern Pacific, this car is actually a Denver & Rio Grande Western prototype (72000-73699) built by General American in 1953. The car's dimensions closely match those found in the January 1958 *Official Railway Equipment Register*.

The model has fine side and end details, including etched-metal grab irons, ladders, and stirrup steps. The corrugations for the drop-bottom doors are on the plastic body shell and the die-cast metal underframe.

A modest amount of brake detail can be found on the bottom of the gondola, including an air reservoir, brake cylinder, and control valve.

The truck-mounted Micro-Trains operating knuckle couplers are at the correct height, and the plastic wheelsets are in gauge. The car weighs 0.6 ounces, which is 0.425 ounces too light based on National Model Railroad Association RP-20.1. — C.G.

### ▶▶ Bullfrog Snot traction-tire maker



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**Manufacturer**

Frogs Frills and Daffodils

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Mission Viejo, CA 92691

[www.bullfrogsnot.com](http://www.bullfrogsnot.com)

**Comments:** The name may make it sound like a joke, but it's Snot.

Bullfrog Snot is a one-part, self-curing liquid plastic designed to be applied to the tread of model locomotive wheels. When it dries 24 hours after application, it forms a thin, greenish traction tire.

I used a scrap of stripwood to apply Bullfrog Snot to one set of

wheels on two locomotives, an Atlas HO scale Fairbanks-Morse H-16-44 and a Life-Like N scale RS-2. The results were significant.

According to the force meter in our workshop, which we use to measure drawbar pull, the N scale Alco went from having a drawbar pull of .64 ounces (equivalent to 15 cars on straight and level track) to .96 ounces (equal to 23 cars). The HO scale road switcher went from a drawbar pull of 3.52 ounces (49 cars) to 8.8 ounces (123 cars).

Bullfrog Snot is a boon for locomotive models with poor traction. — S.O.



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# Trackside Photos



This month, Trackside Photos previews five layouts that will be open for tours during the National Model Railroad Association's 2009 convention, July 5-11 in Hartford, Conn. One of the spectacular layouts on the tour is the HO scale Olympic & Puget Sound Ry. belonging to John Elwood of Stratford, Conn. For more information on the convention, go to [www.hn2009.org](http://www.hn2009.org).

All photos by Phil Monat unless noted

Phil Monat of The Bronx, N.Y., will open his Delaware & Susquehanna Ry. for operations during the convention. Here, two Alco C-636s lead a string of covered hoppers out of a tunnel and over a lake on Phil's HO scale layout.









## Want to see your work in Trackage Photos?

Trackage Photos is a showcase for the work of *Model Railroader* readers. We encourage contributions. Send your photos (original color slides or digital images 5 megapixels or better on CD-ROM) to: *Model Railroader*, Trackage Photos, P.O. Box 1612, Waukesha, WI 53187-1612. Include caption information, such as a description of what's going on in the picture; the name, scale, era, and locale of the layout; and information about the rolling stock or structures pictured. For a copy of our photo submission guidelines, contact editorial associate Eric Stelpflug at 262-796-8776, ext. 583, or [mrmag@mrmag.com](mailto:mrmag@mrmag.com).

Several Alco diesels keep a Boston & Albany 0-8-0 switcher company at the Berkshire Junction engine-house on Dick Elwell's Hoosac Valley RR. Both the New York, New Haven & Hartford and the B&A share trackage rights over Dick's HO scale HVRR, which was featured in *Great Model Railroads 2008*.





Two New Haven passenger trains meet on the Franklin & South Manchester main line through Doytown on George Sellios' HO scale layout. This amazingly detailed layout in Peabody, Mass., has been featured numerous times in *Model Railroader*, most recently in November 2008. Richard

Josselyn photo

A Boston & Maine S-2 pulls past Blue Seal Feed while switching East Deerfield Yard on the HO scale layout built by Bill Duffé of Easthampton, Mass. Bill's railroad, which was featured in the April 2008 *Model Railroader*, is based on the B&M, but is named LKJ&W for the first names of Bill's family members.





# Turning the corner

Tony Koester



Furrows or rows of crops – here soybean plants made from Woodland Scenics clump foliage material – cannot be plowed or planted in straight rows right up to the fence line because the farmer needs room to turn his tractor at the end of each run. Tony Koester photo

**You may have gathered** that I travel a lot. Much of my travel is to hobby-related functions such as National Model Railroad Association conventions and meets, Narrow Gauge National Conventions, railroad historical and technical society conventions, prototype-modeler conventions, and so on. And I can't think of a single such event that didn't enhance my knowledge.

On many occasions, I came home with answers to important questions that I didn't even know enough to ask. As editor of *Model Railroad Planning* and a contributing editor to *Model Railroader*, I see my primary job as that of teacher, communicator, and motivator. I therefore get very excited when someone hands me some new information that I can use myself and can also share with others.

But with this knowledge comes guilt and dissatisfaction. Now that I know the Truth, it's hard to

do things the old, comfortable, but incorrect way.

**The trend toward** more accurate modeling is obvious. There have always been those who model a given prototype (full-size) railroad, as well as those who freelance – do it their own way to a lesser or greater extent. There will always be disciples of both schools of thought.

But the plethora of prototype information that is literally ours for the taking has changed the hobby in highly noticeable ways, even for freelancers. For example, manufacturers now take pains to offer versions of diesel locomotives that are not only painted and lettered, but also detailed for a specific railroad. Those who model such railroads know how their locomotives should look, and the model that doesn't measure up to expectations will be "boiled alive" within hours via the Internet. Never mind how good a maker's

last model was. That was then; this is now. The bar has been raised. Today, we know.

**Let me offer a simple** example of how the process of "new knowledge" works. A number of us are modeling the granger railroads of the Midwest. We've discovered that farms and fields have a beauty and elegance all their own, and – more importantly – we noticed that the Midwest's rail network looks like a giant grid. As one railroad heads west, it crosses a "foreign road" every few miles, and each crossing typically has an interchange. Interchanges are "universal industries" in that almost any type and quantity of car will be found there, giving these connecting tracks a huge advantage over brick-and-mortar industries in terms of traffic generation. You don't even have to model a factory.

The plains railroads move agricultural products from beef to beans, so our scenery needs to reflect these activities. Pastures and fields line the rights-of-way, and thanks to Busch and a few other manufacturers, we can quickly "plant" corn, wheat, or several other cash crops on our layouts.

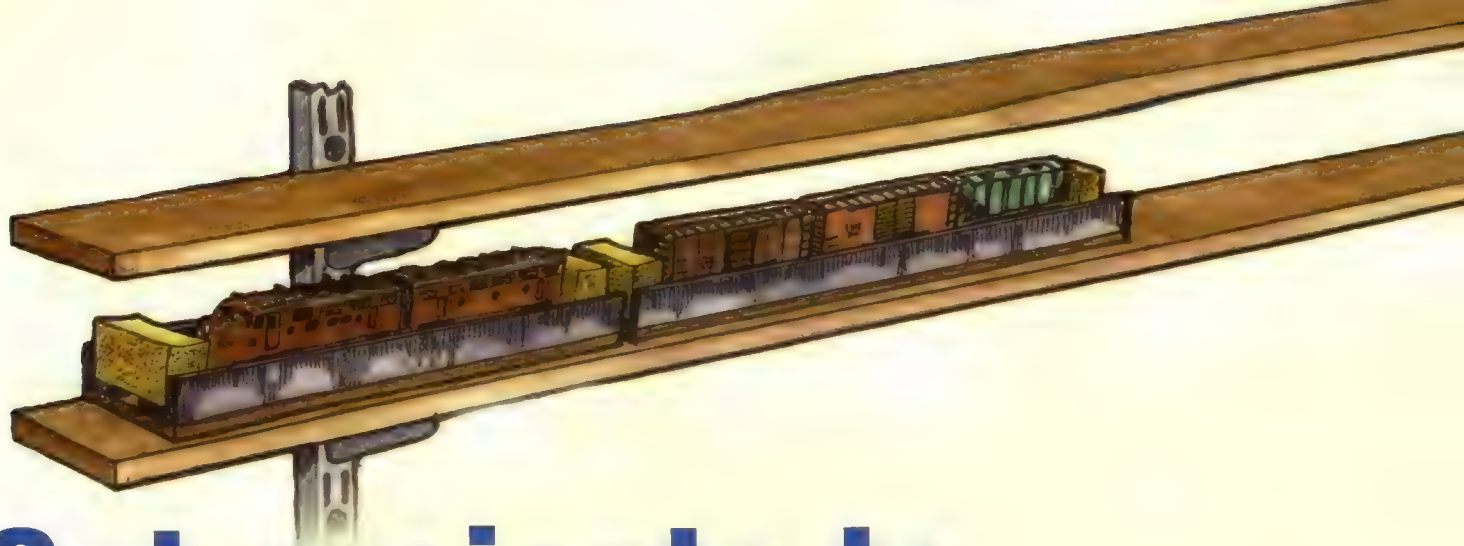
In some cases, we model plowed but not planted fields. The usual technique is to peel off the top layer of kraft paper from corrugated cardboard to show the "furrows," or we use a commercial product of similar appearance. And we run those plowed furrows right up to the fence at either end of the field.

**Question:** How does the farmer get his tractor and plow right up to said fences to plow these arrow-straight furrows?

As anyone who has grown up in farm country can tell you, he doesn't. So there is either an unplanted turn-around area along the end fences, or – more typically in modern times – the last pass of the planter is made parallel to the end fence lines.

Now that you know that, you'll never look at a model field quite the same way again. You've learned something new, and you may have discovered that you have some work to do on your layout to make your plowed fields look a bit more realistic. **MR**

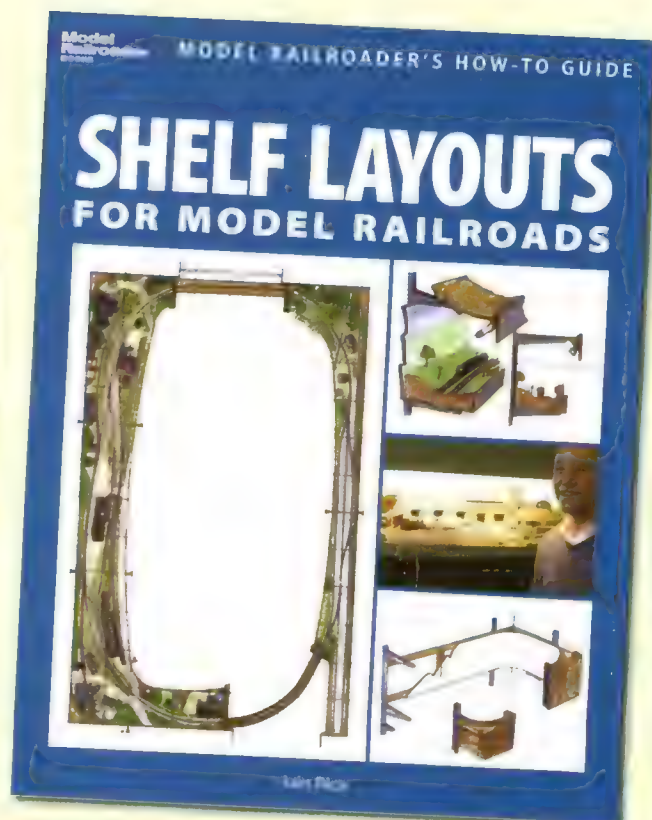




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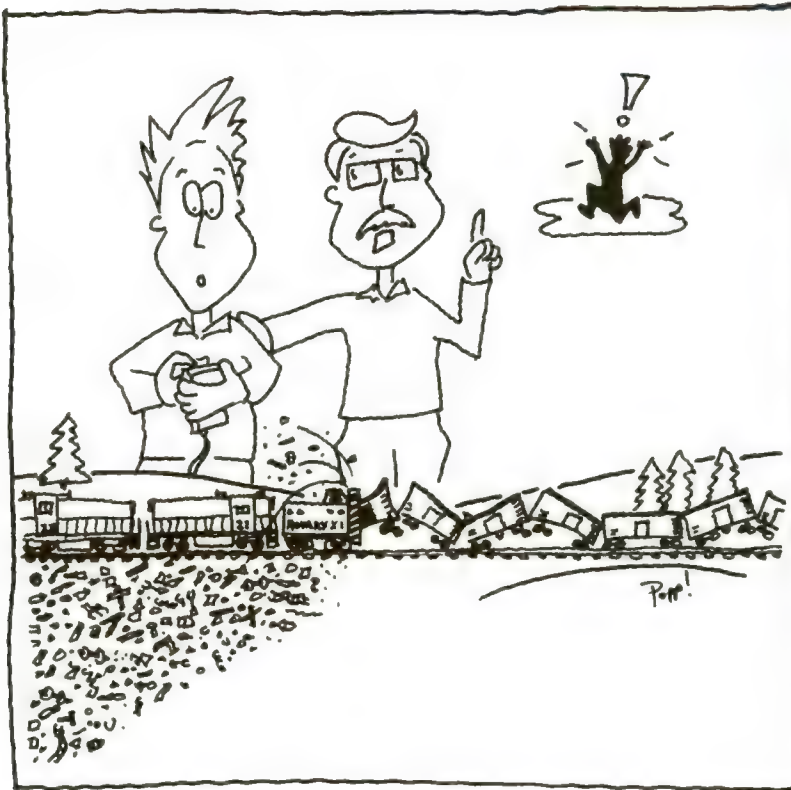
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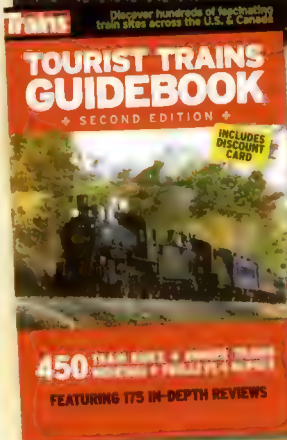
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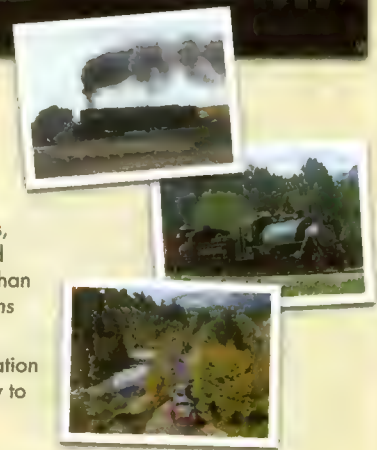


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**CLOSING DATES:** Jan 2009 issue closes Oct. 17, Feb. closes Nov. 16, Mar. closes Dec. 16, Apr. closes Jan. 16, May closes Feb. 16, June closes Mar. 20, July closes Apr. 17, Aug. closes May 15, Sept. closes June 18, Oct. closes July 17, Nov. closes Aug. 18, Dec. closes Sept. 18.

**Note to Readers:** Show dates, times and locations sometimes change. Confirm the details before driving any distance. Please go to [www.mrmag.com](http://www.mrmag.com) and click on the **Schedule of Events** section to get more complete information on these and other coming events.

## Schedule of Events

**AZ, PHOENIX: "IN THE HEAT" SWAP MEET** North Phoenix Baptist Church, 5757 N. Central Ave. Sponsored by Roundhouse Rats. Saturday, July 25th, 2009, 9:00am-1:00pm. Adults \$5.00. All gauges, books, tapes, train rail memorabilia, accessories. Handicap accessible, good food. More information contact David Jerry 602-361-0356.

**CO, GREELEY: 2009 ROCKY MOUNTAIN REGION NMRA CONVENTION:** Greeley Clarion Hotel, 701 8th Street. May 21-24, 2009. Info: [www.2009-rmr-nmra.org](http://www.2009-rmr-nmra.org)

**DE, REHOBOTH BEACH: 6TH ANNUAL DELAWARE SEASIDE TRAIN SHOW** Rehoboth Beach Convention Center, next to Firehouse, Saturday, June 20th, 2009. 10:00am-4:00pm. 150+ tables of trains and train-related items. Operating layouts HO, O, S, N, G scale. \$5.00, children 10/under free. Bill Mixon 302-537-5557; John Hodges 302-682-4652.

**FL, FORT MYERS: GULF COAST EXPRESS III - NMRA SUNSHINE REGION SPRING CONVENTION** Clarion Hotel, 12635 S. Cleveland Ave. May 8-10, 2009. Fourteen clinics, operating session, model contests, special spouse events and layout tours. Non NMRA members welcome. Contact: Peter Gross 239-731-3645 or visit our website: [www.scalerails.org](http://www.scalerails.org)

**MN, CROSSLAKE: NORTHERN TRACKERS RAILROAD CLUB TRAIN SHOW, SALE AND SWAP MEET.** Crosslake Community Center, 14120 Daggett Pine Road. Saturday, July 25, 2009, 10:00-4:00pm. Admission adults \$3.00, children under 12 free with adult admission. Operating layouts, sale, swap meet, food. Contact Clem Maust, 218-765-3106, [cmaust@brainerd.net](mailto:cmaust@brainerd.net)

**NE, NORTH PLATTE: "RAIL FEST"** September 18, 19, & 20, 2009. America's premier railroad event! Tour the world's largest railroad yard and visit the Golden Spike Tower for an aerial view of Bailey Yards. Visit: [www.nprailfest.com](http://www.nprailfest.com) or call 308-534-3648.

**NE, OMAHA: NMRA WESTERN HERITAGE DIVISION ANNUAL MEET.** Burke High, 120th & Dodge. April 25, 2009 9:00am-5:00pm; April 26, 2009 10:00am-4:00pm. Swap meet, clinics, layouts, door prizes, model contests. \$5.00 adults, \$4.00 3 to 12. Contact Barb Lunquist, 402-597-3988, [blundquist1@cox.net](mailto:blundquist1@cox.net)

**NH, HOOKSETT: HOOKSETT LIONS CLUB "SUN-COOK VALLEY MODEL RAILROAD SHOW"** Hooksett Cawley Middle School, 89 Whitehall Rd. April 19, 2009, 10:00am-3:00pm. Adults \$4.00; children 6-12 \$1.00; under 6 free; family \$10.00. For more info contact Wayne Gehris 603-627-4662 or Steve Boyd 603-623-3941; E-mail: [hooksettionsclub@yahoo.com](mailto:hooksettionsclub@yahoo.com)

**NM, ALBUQUERQUE: 14TH ANNUAL ALBUQUERQUE RAILFAIR.** New Mexico State Fairgrounds (School Arts Building), Albuquerque, Saturday, May 16, 2009, 9:00am-4:00pm. Adults \$6.00, under 12 free. Large operating layouts. 250+ tables. Moseley, PO Box 6583, Albuquerque, NM 87197-6583, 505-345-0657.

**OH, BRADFORD: BRADFORD OHIO RAILROAD FESTIVAL AND TRAIN SWAP MEET** Bradford School, 750 Railroad Avenue. Saturday June 20, 2009. 9am-5pm Adults \$4, Children and Seniors \$2, Family \$10. Exhibits, Models, Tours and Children play area. Contact: Marilyn Kosier: 740-654-0177; [mkosier@rohio.com](mailto:mkosier@rohio.com) or visit [www.bradfordmuseum.org](http://www.bradfordmuseum.org) for information.

**OH, COLUMBUS: 45TH BUCKEYE MODEL TRAIN SHOW.** Ohio Expo Center (Lausche Bldg.), 717 East 17th Ave. Saturday, May 9, 2009, 9:00am-4:00pm. Adults: \$6.00, under 12 free. Operating layouts, 300+ tables, Gordon Hartranft, 58 Creed Circle, Campbell, OH 44405, 330-755-1914

**PA, ALLENTOWN: THE GREAT LEHIGH VALLEY TRAIN MEET.** Merchants Square Mall, 1901 South 12th St. May 16-17, Sat: 10:00am-4:00pm, Sun: 10:00am-3:00pm. Over 10,000 square feet of Model & Toy Trains, railroadiana and more! Admission \$5.00 adults/children 12 & under FREE. Valley Rail Promotions, 610-440-0487 [www.lehighvalleytrainmeet.com](http://www.lehighvalleytrainmeet.com)

**PA, MONACA: BEAVER COUNTY MODEL RR SPRING TRAIN SHOW & SALE.** Center Stage, 1495 Old Brodhead Road. Sunday, April 26th, 2009, 10:00am-3:00pm. Adults \$4.00, under 12 free. Sponsored by Beaver County Model RR & Historical Society. Contact: Glenn Wallace 724-775-8023 or [www.bcmrr.railfan.net](http://www.bcmrr.railfan.net) or [info@bcmrr.railfan.net](mailto:info@bcmrr.railfan.net)

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**TX, TYLER: COTTON BELT RAIL HISTORICAL SOCIETY TTC. ANNUAL TRAIN SHOW.** Harvey Convention Center East Texas Fair Grounds, April 25-26, 2009, Saturday 10:00am-5:00pm, Sunday 10:00am-4:00pm. Adults \$6.00, children under 12 \$2.00. Contact Gerald Cooper 903-839-2501.

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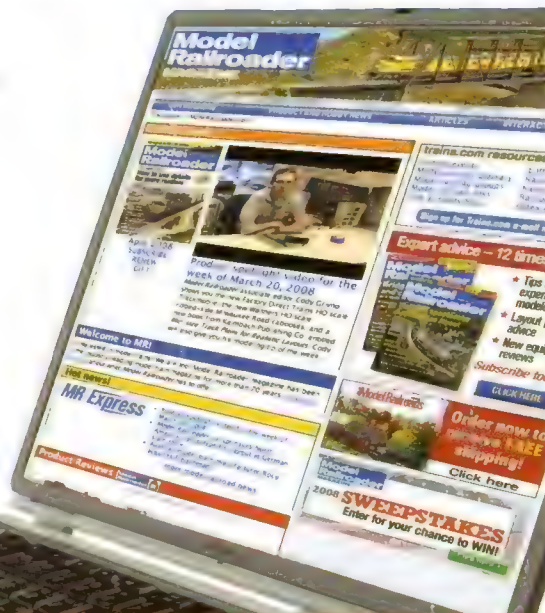
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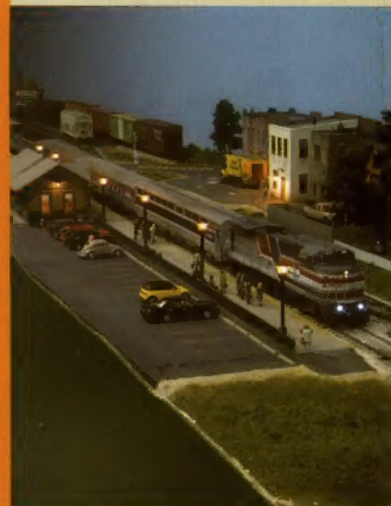
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# Model Railroader MAGAZINE



# The Operators

Andy Sperandeo



A Baltimore & Ohio boxcar stands alone on the Beer Line track scale for weighing, uncoupled from the cars ahead and behind. Bill Zuback photo

## Weighing freight cars

**On our Beer Line** HO layout, most freight car weighing is done by the switch crew working the Elevator Job. Weight is one factor in determining how much the railroad can charge the shipper, so this is important business. I've described the rest of the Elevator Job's work on pages 42 and 43 in this issue. Here I'll explain how this crew weighs cars at the scale track.

The conductor may use any convenient spur track to sort the cars to be weighed into one group. It's most efficient to block the cars together and weigh one after the other, instead of fishing them out of the train one at a time.

The conductor may put extra cars between those being weighed and the engine to serve as a "handle" to keep the engine off the scale, or he can switch the engine onto the gantlet bypass track.

**To the scale.** When the crew is ready, they signal the engineer to pull the cut of cars being weighed and the handle past the switch to the scale track. Then they open the switch and have the engineer back the cut to spot the last car on the scale's live rails. The crew uncouples that car and signals the engineer to pull ahead so only the

one car is left on the scale. The Beer Line's scale was a "spot scale" that weighed one car at a time in this way.

Meanwhile, the conductor gives a list of the cars being weighed to the operator in the scale house. He needs only a moment to read the car's weight and record it on a weigh ticket, a form used to later enter the weight on the car's waybill. Then he rings the scale house bell outside to signal the crew that he's ready for the next car. Some scales automatically print the weigh ticket and ring the bell at the same time.

**Spot, weigh, repeat.** On signal from his ground crew, the engineer backs the cut to push the weighed car past the scale. Then he gets a signal to pull ahead to spot the next car, and then to pull away again once it's uncoupled on the scale. The crew repeats this procedure for every car being weighed before taking the cut back to the train and going on to their next work.

We're simulating the weighing and recording, of course, but we do spot, push, and pull the cars as if the scale really functioned. This adds interest to the switch crew's run, and accurately models the work done on the full-size railroad.

**Weigh-in-motion.** At locations where many cars have to be weighed, railroads use "weigh-in-motion" scales that can weigh cars on the move. Cars can be pushed or pulled over the scale in one continuous motion, although typically no faster than 4 mph. While slow, this is still quicker than using a spot scale. In Walther's HO scale kit, the so-called "heavy-duty scale" represents a weigh-in-motion type.

Not many layouts model hump yards, where cars are sorted by gravity. Full-size hump yards often include weigh-in-motion scales just past the hump apex. At fully automated yards the weight is used along with speed and other factors to control the graduated retarders that slow the cars as they roll into classification tracks.

**Paperwork.** With car cards and four-step waybills, you can simply enter "TO BE WEIGHED" as the destination for the next step after the car is loaded to route it to the nearest scale. After the car has been "weighed," the waybill can be turned to show the actual destination.

Another method is to insert slips reading "TO BE WEIGHED" in front of the waybills of cars to go to the scale when you're setting up your next operating session. The operator who weighs the cars will remove the slips and send the cars on to the destinations shown on the waybills.

**Weighty reading.** For information on prototype track scales, I recommend "Weighing Freight Cars," in *Railway Prototype Cyclopedia Vol. 12*, available from RP CYC Publishing Co., [www.geocities.com/rpcyc/home.html](http://www.geocities.com/rpcyc/home.html).

To model a weigh-in-motion scale, see Ken Pfaff's article, "Modeling track scales," in the September 1991 *Model Railroader*. To build a model scale that actually weighs cars, look up Jim Ferenc's article, "Build a working track scale," in the August 2000 MR.

However you do it, weighing freight cars is a basic prototype procedure that will add realism to your railroad's operations. **MR**



# A Symbol of Change for the BNSF



Photo by Paul Rome

## BNSF "Swoosh" SD70MAC and Bethgon Coalporters

### EMD SD70MAC

Engine: EMD 710  
Style: V16 Turbo  
Horsepower: 4,000  
Trucks: HTCR-II

### BethGon Coalporter

Load: 244,000 lbs  
Material: Aluminum

*Aluminum is commonly used on coal hauling cars instead of steel due to the corrosive nature of coal when mixed with water.*

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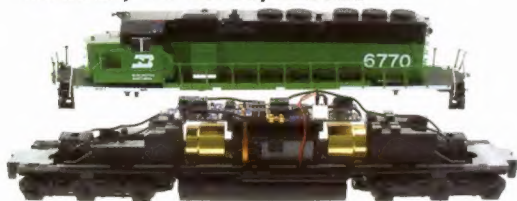
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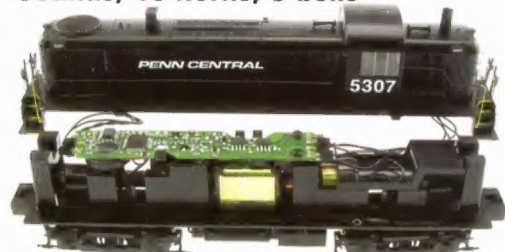
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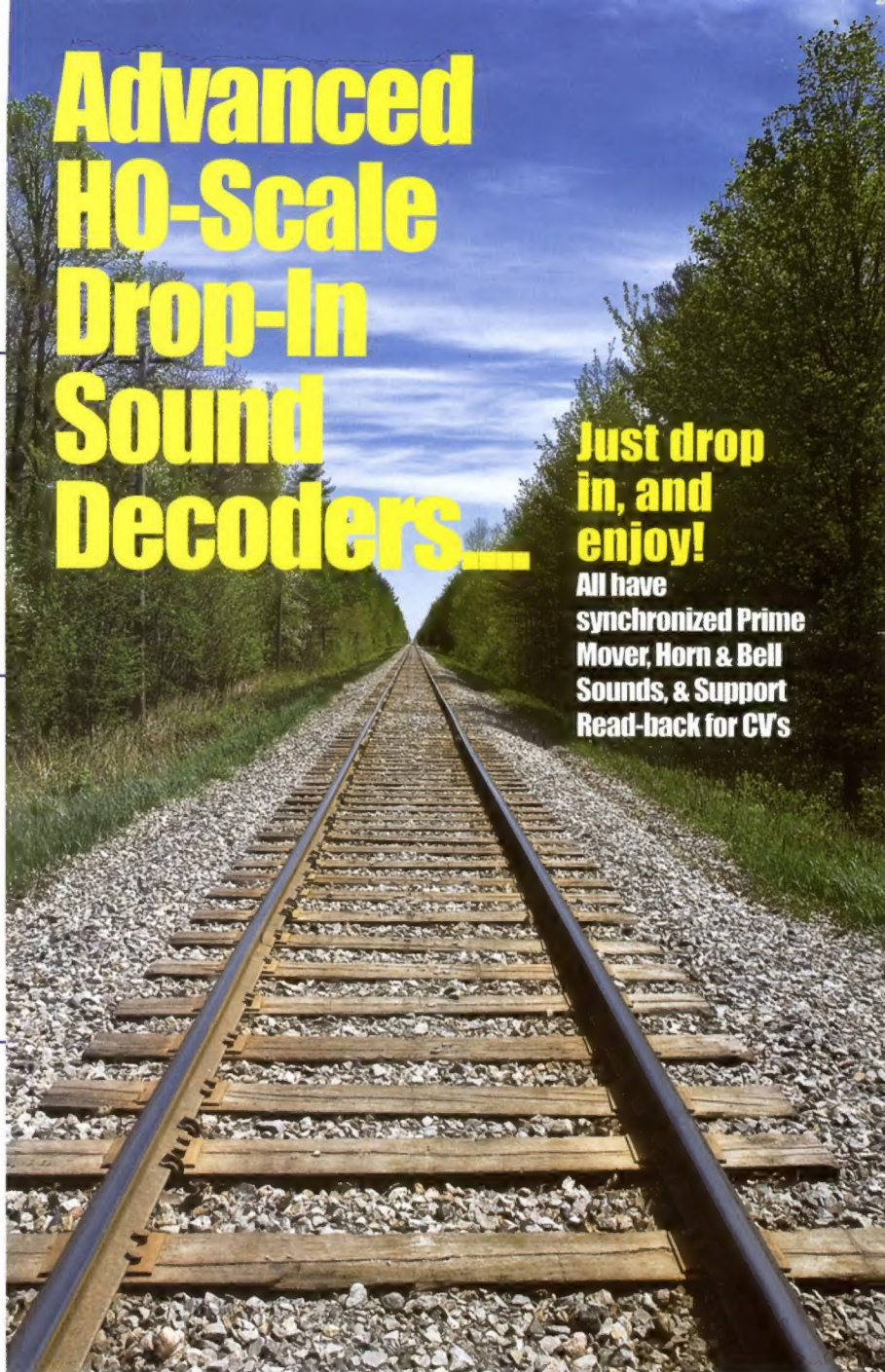
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